Scenes on Central Experimental Farm, Ottawa.

1. Elm leaved Spiraea. 2. Peach leaved Campanula.
3. Office building and Laboratory with surrounding plantation.
4. Part of Lilac group in Arboretum.

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

EXPERIMENTAL FARMS

REPORTS

OF THE

DIRECTOR	WM. SAUNDERS, LL.D.
AGRICULTURIST	J. H. GRISDALE, B. AGR.
HORTICULTURIST	W. T. MACOUN
CHEMIST	F. T. SHUTT, M.A.
ENTOMOLOGIST AND BOTANIST	JAS. FLETCHER, LL.D.
POULTRY-MANAGER	A. G. GILBERT
SUPT. EXPERIMENTAL FARM, NAPPAN, N.S.	R. ROBERTSON
HORTICULTURIST " " "	W. S. BLAIR
SUPT. EXPERIMENTAL FARM, BRANDON, MAN.	S. A. BEDFORD
" " " INDIAN HEAD, N.W.T.	ANGUS MACKAY
" " " AGASSIZ, B.C.	THOS. A. SHARPE

FOR

1901

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EXCELLENT MAJESTY
1902

APPENDIX

TO THE

REPORT OF THE MINISTER OF AGRICULTURE

ON

EXPERIMENTAL FARMS

OTTAWA, December 1, 1901.

SIR,—I beg to submit for your approval the fifteenth annual report of the work done, and in progress, at the several experimental farms.

In addition to my report, you will find appended, reports from the following officers of the Central Experimental Farm: From the Agriculturist, Mr. J. H. Grisdale; from the Horticulturist, Mr. W. T. Macoun; from the Chemist, Mr. Frank T. Shutt, and from the Entomologist and Botanist, Dr. James Fletcher. A report is also submitted from the Poultry Manager, Mr. A. G. Gilbert.

From the Branch Experimental Farms there are reports from Mr. R. Robertson, Superintendent, and from Mr. W. S. Blair, Horticulturist of the Experimental Farm for the Maritime Provinces, at Nappan, Nova Scotia; from Mr. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon; from Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, and from Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm for British Columbia, at Agassiz.

In these reports there will be found the results of many important and carefully conducted experiments in agriculture, horticulture and arboriculture, the outcome of practical work in the fields, barns, dairy and poultry buildings, orchards and plantations at the several experimental farms; also of scientific investigations in the chemical laboratory and the information gained from the careful study of the life histories and habits of injurious insects and the methods by which noxious weeds are propagated and spread, together with the most practical and economical measures for their destruction. In the report of the Entomologist and Botanist will also be found particulars of the experiments and observations which have been made during the past year in connection with the Apiary.

The large and constantly increasing demand by the farmers of the Dominion for the publications issued from the experimental farms is a gratifying evidence of the desire for information among this class of the community, also of the high esteem in which these records of the work of the farms are held. It is hoped that the facts brought together in the present issue will be found of much practical value to the Canadian farmer and fruit-grower and that they may assist in advancing agriculture and horticulture in this country.

I have the honour to be, sir,

Your obedient servant,

WM. SAUNDERS,

Director Experimental Farms

To the Honourable
The Minister of Agriculture,
Ottawa.

ANNUAL REPORT

ON THE

EXPERIMENTAL FARMS

REPORT OF THE DIRECTOR, WM. SAUNDERS, LL.D., F.R.S.C., F.L.S.

The year 1901 has, on the whole, been an encouraging one for Canadian farmers. While some crops in Ontario, Quebec and the maritime provinces have fallen below the average yield, others have been unusually good, and the excellent prices received for nearly all farm products during the year have helped to make up for any shortage in particular crops. In Ontario, fall wheat, oats and pease have given yields unusually light, while hay, which occupies a nearly equal area, has given a remarkably heavy return, and the product has been of good quality. Hay has also given exceptionally large crops in Quebec and the maritime provinces, in which sections, however, oats have fallen below the average. Spring wheat and barley are said to have produced nearly average returns in the eastern provinces, while Indian corn and field roots have gone above the average.

In the western provinces of Manitoba and British Columbia, agricultural crops of all sorts have been very good, while in many parts of the North-west Territories the yields have been extraordinary and probably unprecedented.

The experimental farms have had results corresponding much with those of the best farmers in their neighbourhood, and on the whole, as will be seen by consulting the following pages, the returns have been very encouraging. The Fifteenth Annual Report of the work of these institutions is herewith presented. The reports previously issued, one of which has appeared annually for the last fourteen years,—covering practical experimental work to determine many points along all the different lines embraced in Canadian agriculture, horticulture, forestry and ornamental planting—have had a wide influence in moulding the thought and practice of a large number of the more intelligent people engaged in these various branches of work, and through them, have wielded an influence on others. Object lessons, framed after the best methods, and covering a very large field, have been provided every year at each of the experimental farms, and visiting farmers who have come to learn, as many of them annually do, have carried home with them useful ideas, which, put in practice on their own farms, have added to the profits of their business.

Those who are so situated that they cannot visit the farms, can receive free, by asking for them, the annual reports and the bulletins prepared by the officers of the farms, replete with information covering, as fully as is practicable, many of the different lines of work undertaken, and the results can be studied at leisure. Thus, the information acquired is spread over the whole Dominion. Nearly fifty thousand farmers now receive the publications of the experimental farms, and their number is steadily increasing.

The experimental farms were among the first agencies provided for the special purpose of aiding Canadian farmers in the solution of the many difficulties which surround their calling in the various climates of the Dominion, and the progress which has been made in all branches of this national industry owes, no doubt, much to the more general adoption of the sound principles governing good farming, which have been persistently advocated on every occasion by the officers of these institutions. The many problems associated with the thorough preparation of the soil, and the best methods to adopt to maintain its fertility, have been carefully investigated and reported on. The great importance of selecting the most productive sorts of seed has been repeatedly urged and tangible proofs offered of the success attending such practice. To encourage and assist farmers in their endeavours along this line, varieties of wheat, oats, barley, and pease of established value have been grown in considerable quantities on the experimental farms for the past 12 or 13 years, and distributed in sample bags, free, by mail, to all farmers who apply for them. The demand for these samples has been so great that it has been found necessary to limit the number sent, to one only to each applicant. For the past six years more than thirty thousand farmers have participated annually in these co-operative experiments, which have involved the free distribution, through the mail, of over sixty tons of seed each season. The liberal provision thus made for Canadian farmers by the Dominion government has been of very great benefit, and there are now, as a result of this work, many of these high class productive sorts of grain under cultivation in almost every settled locality throughout the Dominion. In addition to the actual gain resulting from the general introduction of more profitable sorts of grain, this work has had a wide educational influence. Farmers have learned to observe the characteristic variations in varieties and their powers of observation and comparison, thus awakened, have been brought to bear on other problems in their calling, to their individual advantage and profit. The cultivation of these good sorts by the more enterprising farmers has interested their neighbours, who have benefited in turn, and hence the good influences attending this useful work are extending through all sections of the farming community.

Some other branches of special work which have been under my personal charge have also made considerable progress. The experiments conducted in the cross-breeding of commercial apples and hardy Siberian crabs, with the object of producing very hardy apple trees, such as are likely to be adapted to the climates of our north-west country (where ordinary sorts do not grow), have been successfully continued. Several new varieties have fruited during the past year, which promise to be of value. Some very interesting new crosses in wheat have also been produced. A large number of samples of grain has been tested for vitality, received from farmers in different parts of the country. Some particulars relating to these tests, and the number of them, will be found at a subsequent page in the report from Mr. W. T. Ellis, who has charge of this branch of the work.

Many desirable additions have been made to the collection of ornamental trees and shrubs on the grounds surrounding the buildings on the Central Experimental Farm, which have thus been made additionally attractive and instructive to visitors.

The accompanying report will be found to contain a large amount of practical information, such as is likely to be helpful to all those who are engaged in Canada's great national industry, agriculture.

EXPERIMENTAL WORK

CONDUCTED AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, ONTARIO.

EXPERIMENTS WITH OATS.

One hundred and seven varieties of oats have been under trial in the test plots at the Central Experimental Farm during 1901. The object of these experiments has been to gain information as to the relative productiveness, earliness and other characteristics of the different sorts. The soil on which these oats were sown was a heavy sandy loam of good quality, more or less mixed with clay. The previous crop was field roots. The land received a dressing in the winter of 1899-1900 of about twelve tons of fresh barn-yard manure per acre, which was placed on the frozen ground in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1900, after the roots were gathered, the land was ploughed about seven inches deep and left in that condition until the following spring when it was cultivated twice with a two-horse cultivator and harrowed twice with the smoothing harrow before the oats were sown.

The seed of most of the varieties was sown on April 17, the remainder from April 26 to 29 all on plots of one-fortieth of an acre each, seed being used in each case at the rate of two bushels per acre.

Among the new sorts brought under trial are Irish Victor, Beseler and Atlantic, all white branching oats. Pioneer, a black branching oat, and Goldfinder, a large yellow half-sided oat, both new introductions of the Garton Bros., of Newton-le-Willows, England. To Prof. C. Doxrud, of the Technical School, Christiania, Norway, I am indebted for two varieties of oats from that country. Black No. 6 and Summer No. 5, and from the United States Department of Agriculture I have also received two new sorts, Tobolsk 2800, and Zhelanni 2963.

Included in the list there are also thirteen cross-bred sorts, all of which have been originated on the experimental farms:—Brandon, Cromwell, Holland, Kendal, King, Master, Medal, Milford, Miller, Olive, Oxford, Pense and Russell.

There are also two new cross-bred sorts in the list this year. These are further results of the work in cross-breeding done by Dr. A. P. Saunders, at Brandon, in 1892. The following are their names and parentage:—

Dixon.—Black Tartarian female, with Early Gothland male.

Forbes.—Giant Cluster female, with Prize Cluster male.

It will be seen from the following results that oats have fallen below the average in yield this year.

OATS—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.		Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
					Inches.		Inches.		Bush.	Lbs.	Lbs.	
1	Liberty	Aug.	8	102	51—53	Stiff	8½—9½	Branching	64	21	33	Considerably.
2	Virginia White Abundance	July	23	94	50—52	"	9—10	"	60	—	37½	Slightly.
3	Cromwell	"	25	100	49—51	"	10—11	Half sided	58	8	36½	Considerably.
4	Uberfluss	"	28	103	50—52	"	9—10	Branching	57	2	31	Slightly.
5	Joanette	"	28	103	35—37	"	8—9	"	57	2	36¼	"
6	Columbus	"	26	101	39—41	"	8—9	"	57	2	35	"
7	Milford, Black	"	31	96	49—51	"	10—11	Half sided	57	2	33	Badly.
8	Doncaster Prize	"	29	94	51—53	Weak	9—10	Branching	57	2	31	"
9	Kendal, White	Aug.	4	100	49—51	Stiff	8½—9½	Half sided	55	30	33	Considerably.
10	Early Maine	July	25	100	40—42	"	11—12	Branching	55	10	33½	Slightly.
11	American Triumph	"	25	100	39—41	"	8—9	"	54	24	33	Considerably.
12	Lincoln	"	25	100	38—40	"	8¾—9½	"	54	24	35	"
13	Improved American	"	25	100	40—42	"	8—9	"	54	24	33	"
14	Olive, Black	"	31	96	51—53	Medium	9—10	Half sided	54	24	33	Badly.
15	Mennonite	"	23	98	37—39	Stiff	7—8	Branching	54	24	31	Considerably.
16	Eureka	"	31	96	54—56	Medium	9—10	"	53	18	30	"
17	Black Beauty	"	20	95	41—43	Stiff	10—11	"	53	18	32½	Slightly.
18	Rennie's Prize White	Aug.	2	96	55—57	Weak	9—10	"	52	32	34	Badly.
19	Milford, White	July	31	96	50—52	Stiff	10—11	Half sided	52	12	34	"
20	Oxford	"	25	100	45—47	"	9—10	"	51	26	37½	Considerably.
21	Abundance	"	25	100	41—43	"	9½—10	Branching	51	6	33½	Slightly.
22	Olive, White	"	31	96	53—55	"	8—9	Half sided	50	—	33½	Considerably.
23	Pense, Black	"	31	96	52—54	"	9—10½	"	50	—	32	Badly.
24	California Prolific B.	"	28	103	40—42	"	7½—8½	Sided	50	—	32	Slightly.
25	Prolific Blk. Tartar'n	"	28	103	40—42	"	8—9	"	48	28	34	"
26	Leutewitzer	"	29	94	50—52	Weak	9—10½	Branching	48	28	30	Considerably.
27	Banner	"	25	100	41—43	Stiff	9½—10½	"	48	28	33	Slightly.
28	Anderbecker	Aug.	2	98	55—57	Medium	9—10	"	48	28	31½	Considerably.
29	King	July	25	100	39—41	Stiff	9½—10½	"	48	28	36½	Slightly.
30	Holstein Prolific	"	25	100	41—43	"	9—10	"	48	28	36	"
31	American Beauty	"	23	98	39—41	"	8—9½	"	48	8	37	"
32	Irish Victor	"	25	100	39—41	"	8—9	"	48	8	35	"
33	Aitken, Black	"	28	103	44—46		10½—11	"	48	8	34½	"
34	Selchower	"	29	94	58—60	Weak	10—11	Sided	48	8	33	Badly.
35	Pense, White	"	31	96	57—59	Stiff	9—10½	Half sided	47	22	34	"
36	Sensation	"	25	100	44—46	"	8—9	Branching	47	22	37½	Considerably.
37	Cream Egyptian	"	25	100	39—40	"	8—9½	Half sided	47	22	37	"
38	Thousand Dollar	"	23	98	42—44	"	8½—9½	Branching	47	22	35	Slightly.
39	Russell	"	25	100	41—43	"	9—10	"	47	22	34½	"
40	Poland	"	29	94	58—60	Weak	9—10½	"	47	22	36	Badly.
41	Rosedale	"	28	103	43—45	Medium	8—9	Half sided	47	2	37½	Considerably.
42	Salzer's Big Four	"	23	98	39—41	"	10—11	Branching	47	2	32½	"
43	Hazlett's Seizure	"	25	100	41—43	Stiff	8—9½	"	46	16	34	Slightly.
44	Master	"	28	103	46—48	"	9½—10	Half sided	46	16	35½	"
45	White Schonen	"	25	100	41—43	"	8—9	Branching	46	16	34½	"
46	Bestehorn's Abun'nce	Aug.	8	102	40—42	"	7—8½	"	45	30	34¾	"
47	Buckbee's Illinois	July	25	100	44—46	"	8—9	"	45	10	38½	Considerably
48	Golden Beauty	"	25	100	42—44	Medium	8—9½	"	45	10	33½	Slightly.
49	Blk. Tartarian Imp.	"	28	103	40—42	Stiff	8½—9	Sided	45	10	35	"
50	Tobolsk No. 2800	"	29	104	42—44	"	9—10	Branching	44	4	36¾	Considerably.
51	Oderbruch	"	28	103	44—46	"	9—10½	Half sided	44	4	35½	"
52	Danish Island	July	26	101	40—42	Stiff	9—10½	Branching	44	4	31½	Considerably.
53	White Giant	"	26	101	43—45	"	9—10	"	44	4	31	Slightly.
54	Newmarket	"	25	100	41—43	"	8½—9½	"	44	4	37	"
55	Improved Ligowo	"	23	98	39—41	Medium	8—9½	"	44	4	37	Badly.
56	Early Dawson	"	26	91	50—52	Weak	10—11	"	44	4	32½	Considerably.
57	Early Gothland	"	26	101	43—45	Stiff	9—10	Half Sided	44	4	37½	Slightly.
58	Victoria Prize	"	25	90	46—48	Weak	10½—11½	Branching	43	18	36	Considerably.
59	New Zealand	Aug.	7	113	44—46	Stiff	9—10½	Sided	42	12	34½	"
60	Dixon	"	8	102	41—43	"	9—10	"	42	12	35½	Slightly.
61	Wide Awake	July	25	100	38—40	"	8—9½	Branching	41	26	34½	"
62	Holland	"	23	103	33—40	"	9—10½	Sided	41	26	33	"

OATS—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	Number of days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
63	Pioneer	July 25	100	34—36	Stiff	9 —10	Branching	41	26	35	Considerably.
64	Early Blossom	" 28	103	41—43	"	8 — 9½	Half Sided	41	26	30½	"
65	Beseler	Aug. 10	104	45—47	"	9½—10½	Branching	41	26	35½	Badly.
66	Black No. 6 Summer	" 8	105	47—49	"	9 —10½	Sided	41	6	32	"
67	Scottish Chief	" 2	96	43—45	"	11 —12	Branching	41	6	38	Slightly.
68	Bavarian	July 25	100	42—44	"	10 —11	"	40	20	34	"
69	Abyssinia	" 28	103	39—41	"	9 —10	Half Sided	40	20	34	Considerably.
70	Wallis	" 23	98	37—39	"	8 — 9½	Branching	40	20	37¾	Slightly.
71	Winter Grey	" 26	91	53—55	Weak	10 —11	"	40	20	31½	Badly.
72	Salines	" 29	104	42—44	Stiff	10 —11½	"	40	20	33	Considerably.
73	Australian	Aug. 2	108	43—45	"	9 —10	Sided	40	20	31	"
74	Flying Scotchman	July 22	97	45—47	"	9½—10½	Branching	40	..	33	"
75	Goldfinder	" 28	103	42—44	"	9 —10	Half Sided	39	14	31	Slightly.
76	Mortgage Lifter	" 28	93	50—52	Weak	9 —10½	Branching	39	14	36½	"
77	Miller	" 31	106	42—44	Stiff	8 — 9	"	39	14	34½	"
78	Sargentfree	Aug. 2	96	42—44	"	8 — 9½	"	38	28	37½	"
79	Probstey	" 8	102	42—44	"	7 — 8½	"	38	28	35	Considerably.
80	Imported Irish	July 25	100	40—42	"	9 —10	"	38	8	37½	Slightly.
81	Black Mesdag	" 20	95	41—43	"	10 —12	"	37	22	31½	"
82	Forbes	Aug. 8	102	40—42	"	8 — 9	Sided	37	22	30	Considerably.
83	Atlantic	" 7	101	43—45	"	8½— 9½	Branching	37	22	36¾	Badly.
84	Brandon	July 28	103	45—47	"	10 —11	Half Sided	37	2	32½	Slightly.
85	White Russian	" 25	100	41—43	"	8 — 9	Branching	37	2	35	Considerably.
86	Russell Half Sided	Aug. 2	96	42—44	"	10 —11	Half Sided	36	16	36	Slightly.
87	Kendal Black	" 6	102	51—53	"	8½— 9½	"	36	16	34	Badly.
88	White Wonder	July 23	88	40—42	"	9 —10	Branching	35	30	36½	Slightly.
89	Bayonet	" 26	91	43—45	"	10 —11	"	35	30	36½	"
90	Great Northern	" 31	96	39—41	"	8 — 9	"	35	30	32	Considerably.
91	Siberian	" 28	103	43—45	"	8 — 9	"	34	24	34	Slightly.
92	Bonanza	" 22	97	44—46	Medium	10 —11½	"	33	18	36½	Badly.
93	Coulommiers	Aug. 2	108	43—45	Stiff	10 —11	"	33	18	35½	Considerably.
94	Welcome	July 23	88	39—41	Medium	9 —10½	"	32	32	36½	Slightly.
95	Swedish Select No. 2788	" 29	104	38—40	Stiff	7 — 8½	"	32	32	35½	Considerably.
96	Russell Branching	Aug. 8	102	36—38	Medium	8 — 9	"	32	32	37½	Slightly.
97	Golden Giant	July 28	103	40—42	"	9 —10	Sided	32	12	31	"
98	Early Archangel	" 23	98	37—39	"	9 —10½	Branching	32	12	37	Badly.
99	Early Golden Prolific	" 25	100	36—38	Stiff	8 — 9	"	32	12	31	Slightly.
100	Golden Tartarian	" 31	106	38—40	"	9 —10	Sided	31	6	30	Considerably.
101	Tartar King	" 23	98	39—41	"	9 —10½	"	31	6	32	Badly.
102	Duppaner Summer, No. 5	Aug. 6	103	46—48	"	9 —10	Branching	31	6	33	Considerably.
103	Waverley	July 25	100	40—42	"	7 — 8	"	30	..	34½	Slightly.
104	Longhoughton	" 28	103	30—32	Medium	9 —10	"	20	20	33½	"
105	Scotch Potato Imp., 1901	" 28	103	32—34	"	8 — 9½	"	20	20	35½	Badly.
106	Medal	Aug 7	103	44—46	"	10 —11	Half Sided	19	14	32	"
107	Zhelanni, No. 2963	July 29	104	46—48	Weak	11 —12½	Branching	18	28	33½	Slightly.

SELECT LIST OF OATS.

Seven years ago a system of uniform trial plots was planned to be conducted at all the experimental farms, which provided for the growing of the promising sorts of the most important agricultural crops side by side, on similar soil and all of the same class being sown on the same day so that the conditions might be uniform. The results have been published each year since in an annual crop bulletin which has been issued as early in the season as practicable. After three years of trial the average yields for that period obtained at all the experimental farms was published in the bulletin for

1897 (No. 29). Similar results with added experience have been published in the annual crop bulletin each year since, the results for the seventh year, 1901, having recently appeared in bulletin No. 39. In these bulletins the six or twelve sorts found most productive on each farm have been specially noted. All those varieties which during five years' trial do not find their way at any time into these lists of the best sorts at any of the experimental farms are dropped from the list at the end of that period to make room for other new and promising kinds. Occasionally where a variety of grain shows some radical defect, such as persistent weakness of straw, it is discarded after a shorter trial. By this method the lists are kept within reasonable limits.

The following sorts of oats have been thus dropped during the past two or three years:—Coulommier's, Doncaster Prize, Early Dawson, Early Etampes, Imported Irish, Medal, Mortgage Lifter, Poland, Prize Cluster, Rennie's Prize, Scotch Hopetoun, Welcome, White Monarch, White Wonder, Winter Grey. Some of the varieties so discarded from the uniform trial plots are still continued in the general list grown at some of the experimental farms in the discretion of the superintendent.

In the following list of oats the average yield per acre at all the experimental farms is given of all the varieties which have been under trial for three years or over. The periods reported on range from three to seven years.

SELECT LIST OF VARIETIES OF OATS.

Number.	Names of Varieties.	Kind of Head.	Colour of Grain.	Number of Years under test.	Average yield per acre at all the Experimental Farms.	
					Bush.	Lbs.
1	Banner	Branching	White	7	76	14
2	American Beauty	"	Yellow	7	75	33
3	Mennonite	"	"	6	75	23
4	Danish Island	"	White	4	75	21
5	New Zealand	Sided	"	3	75	19
6	Black Beauty	Branching	Black	5	74	3
7	Improved American	"	White	5	73	29
8	White Giant	"	"	4	73	5
9	Thousand Dollar	"	"	4	73	1
10	Holstein Prolific	"	"	7	72	31
11	Bavarian	"	"	7	72	21
12	Buckbee's Illinois	"	"	6	72	4
13	Golden Beauty	"	Yellow	7	71	32
14	Salines	"	"	3	71	27
15	Columbus	"	"	7	71	17
16	Golden Giant	Sided	"	7	71	8
17	Early Golden Prolific	Branching	White	7	71	—
18	Abundance	"	"	7	70	20
19	American Triumph	"	"	7	70	20
20	Kendal	Half sided	Black	3	70	18
21	Lincoln	Branching	White	7	70	16
22	Golden Tartarian	Sided	Yellow	5	70	8
23	White Schonen	Branching	White	7	69	31
24	Oderbruch	Half sided	"	7	69	25
25	Siberian	Branching	"	5	69	22
26	Wallis	"	"	7	69	14
27	Holland	Sided	Yellow	4	69	1
28	Wide Awake	Branching	White	7	68	32
29	Early Blossom	Half sided	"	7	68	13
30	Early Gothland	"	"	7	68	1
31	Improved Ligowo	Branching	"	7	67	18
32	Olive	Half sided	Black	6	67	15
33	Early Maine	Branching	White	7	67	6
34	California Prolific Black	Sided	Black	7	67	3
35	White Russian	Branching	White	7	67	2
36	Hazlett's Seizure	"	"	7	66	20
37	Early Archangel	"	"	7	66	16

SELECT LIST OF OATS—*Concluded.*

Number.	Names of Varieties.	Kind of Head.	Colour of Grain.	Number of Years under test.	Average yield per acre at all the Experimental Farms.	
					Bush.	Lbs.
38	Milford	Half sided	Black	3	65	23
39	Joanette	Branching	"	7	65	18
40	Newmarket	"	White	5	65	16
41	Cromwell	Half sided	Yellow	6	65	5
42	Abyssinia	"	White	7	65	3
43	Miller	Branching	"	6	64	25
44	Rosedale	Half sided	"	7	64	21
45	Pense	"	Black	6	64	15
46	Prolific Black Tartarian	Sided	"	7	64	10
47	King	Branching	White	5	64	2
48	Russell	Half branching	Yellow	6	63	29
49	Flying Scotchman	Branching	White	7	63	16
50	Master	Half sided	Yellow	6	62	21
51	Oxford	"	White	6	62	10
52	Cream Egyptian	"	"	7	61	33
53	Bonanza	Branching	"	7	61	26
54	Brandon	Half sided	Yellow	6	61	25
55	Black Mesdag	Branching	Black	4	60	22

EXPERIMENTS WITH BARLEY.

Sixty-seven different sorts of barley have been under test at the Central Experimental Farm during 1901. Thirty of these have been two-rowed sorts, and thirty-seven six-rowed. The land on which the barley was sown, adjoined that used for oats, and was of the same character and quality and had similar manuring and preparation. The size of the plots was one-fortieth of an acre each. The two-rowed sorts were sown at the rate of two bushels per acre, and the six-rowed at the rate of one and three-quarter bushels per acre. The seed of nearly all these varieties of barley, both two-rowed and six-rowed was obtained from selected heads picked by hand, the largest and plumpest being chosen.

Among the two-rowed sorts there are six new varieties this year. Oregon received from the United States, Bestehorn's Kaiser and Fitchel Mountain from Germany, Plumage from Norway and Standwell and Invincible, two varieties recently introduced by the Garton Bros., Newton-le-Willows, England. In this group are also included the following seventeen hybrid sorts, all of which have been produced at the experimental farms. Beaver, Bolton, Clifford, Dunham, Fulton, Gordon, Harvey, Jarvis, Leslie, Logan, Monck, Nepean, Pacer, Pelham, Rigid, Sidney and Victor.

TWO-ROWED BARLEY—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
					Inches.		Inches.	Bush.	Lbs.	Lbs.	
1	French Chevalier	July	25	90	41—43	Medium	3½—4	55	10	51½	No rust.
2	Danish Chevalier	"	23	93	34—36	"	3½—4	47	4	52	"
3	Beaver	"	20	85	40—42	Stiff	3¼—3¾	46	2	50½	"
4	Canadian Thorpe	"	23	88	35—37	"	2½—3	45	10	50½	"
5	Standwell	"	23	88	35—37	Medium	2½—3	42	34	51½	"
6	Clifford	"	23	88	45—47	Stiff	3½—4	41	42	51½	"
7	Nepean	"	23	88	49—51	Medium	3½—3¾	41	2	51	"
8	Logan	"	23	88	43—45	"	4—4½	39	18	50½	Slightly.
9	Kinver Chevalier	"	25	90	33—35	"	3½—4	36	22	50½	No rust.
10	Plumage from Norway	"	28	93	36—38	Stiff	3—3½	34	28	51½	"
11	Gordon	"	20	85	42—44	"	2—2½	33	46	50½	"
12	Jarvis	"	18	83	40—42	"	3—3½	31	42	49	"
13	Sidney	"	22	87	47—49	Medium	4—4½	31	22	51	"
14	Prize Prolific	"	28	93	31—33	Stiff	4—4½	31	12	51¼	"
15	Dunham	"	20	85	42—44	"	3—3½	30	30	48¼	"
16	Invincible	"	28	93	30—32	"	2¾—3¼	29	28	52	"
17	Pacer	"	24	89	35—37	"	3½—4	26	42	49½	Slightly.
18	Pelham	Aug.	2	95	36—38	"	3½—4	26	12	51¼	"
19	Bolton	July	22	94	38—40	"	3—3½	25	10	51	No rust.
20	Fichtel Mountain	Aug.	2	95	32—34	"	3½—4	22	4	50¾	Slightly.
21	Victor	July	23	88	36—39	"	3½—4	21	42	52	No rust.
22	Improved Thanet	Aug.	6	99	35—37	Medium	4—4½	21	12	46	Considerably.
23	Bestehorn's Kaiser	"	8	101	36—38	Stiff	3—3½	20	20	48¼	"
24	Fulton	July	25	90	38—40	"	2½—3	20	10	49	Slightly.
25	Oregon	Aug.	8	101	31—33	Weak	4—4½	18	36	46	"
26	Duck-bill	"	8	96	25—27	Medium	2½—3	16	12	....	Considerably.
27	Harvey	July	25	97	35—37	Stiff	3—3½	14	38	49½	No rust.
28	Monck	Aug.	6	99	40—42	"	3½—4	14	28	50½	Badly.
29	Rigid	"	8	101	32—34	"	3—3½	14	28	49	Slightly.
30	Leslie	July	25	97	34—36	"	3½—4	11	2	50½	No rust.

SELECT LIST OF VARIETIES OF TWO-ROWED BARLEY.

In this list is given the average yield per acre obtained during the past three to seven years from the most productive varieties grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. Further particulars as to how these select lists have been worked up will be found under 'Select list of oats.'

Number.	Names of Varieties.	Number of Years under trial	Average yield per acre at all the Experimental Farms.		Number.	Names of Varieties.	Number of Years under trial	Average yield per acre at all the Experimental Farms.	
			Bush.	Lbs.				Bush.	Lbs.
1	French Chevalier	7	46	6	10	Nepean	6	42	7
2	Jarvis	3	45	7	11	Newton	7	42	3
3	Clifford	3	44	44	12	Fulton	3	41	21
4	Harvey	3	44	21	13	Leslie	4	41	20
5	Dunham	5	44	16	14	Bolton	7	41	19
6	Beaver	7	43	39	15	Sidney	7	41	16
7	Danish Chevalier	7	43	31	16	Prize Prolific	7	40	12
8	Canadian Thorpe	7	43	26	17	Kinver Chevalier	7	39	7
9	Logan	4	42	38	18	Victor	6	38	41

SIX-ROWED BARLEY—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
					Inches.		Inches.	Bush.	Lbs.	Lbs	
1	Odessa..........	April 19	July 18.	90	40—42	Stiff	$3-3\frac{1}{2}$	41	2	$50\frac{1}{2}$	No rust.
2	Mensury..........	May 15	Aug. 6.	83	39—41	"	$3-3\frac{1}{2}$	39	8	$47\frac{3}{4}$	Badly.
3	Stella..........	April 19	July 18.	90	36—38	"	$3\frac{1}{4}-3\frac{3}{4}$	36	42	52	No rust.
4	Claude..........	" 19	" 18.	90	38—40	"	$2\frac{1}{2}-3$	36	42	$49\frac{1}{2}$	"
5	Munro..........	May 3	" 22.	80	38—40	"	$3-3\frac{1}{2}$	35	10	50	"
6	No. 8 from Norway	April 26	" 17.	82	42—44	Medium..	$2\frac{1}{2}-3$	34	18	$50\frac{1}{2}$	"
7	Royal..........	" 19	" 18.	90	36—38	Stiff......	$3-3\frac{1}{2}$	33	26	$50\frac{3}{4}$	"
8	Nugent..........	" 19	" 18.	90	38—40	Medium..	$3-3\frac{1}{2}$	33	6	$50\frac{1}{2}$	"
9	Blue Long Head..	" 26	" 24.	89	36—38	Stiff......	$2\frac{1}{2}-3$	31	42	$44\frac{1}{2}$	"
10	Princess Sialof....	May 3	Aug. 6.	95	34—36	Medium..	$3\frac{1}{2}-4$	29	28	$48\frac{1}{2}$	Slightly.
11	Rennie's Improved	April 19	July 18.	90	38—40	Stiff.....	$2-2\frac{1}{2}$	29	18	51	No rust.
12	Parkin..........	May 3	" 22.	80	37—39	"	$2\frac{1}{2}-3$	29	18	47	"
13	Petschora..........	April 19	" 17.	89	38—40	Medium..	$3-3\frac{1}{2}$	27	34	48	"
14	Pioneer..........	" 19	" 22.	94	38—40	Stiff......	$3-3\frac{1}{2}$	27	34	50	"
15	Vanguard..........	" 19	" 18.	90	38—40	"	$3\frac{1}{2}-4$	27	34	52	"
16	Beardless from Salzer..........	May 3	" 22.	80	38—40	"	$2\frac{1}{2}-3$	27	34	47	"
17	Albert..........	April 19	" 17.	89	36—38	Medium..	$2\frac{1}{2}-3$	26	42	$51\frac{1}{2}$	"
18	Garfield..........	" 19	" 20.	92	38—40	Stiff......	$2\frac{1}{2}-3$	26	22	$49\frac{1}{2}$	"
19	Yale..........	" 19	" 22.	94	38—40	"	$3-3\frac{1}{2}$	26	2	$49\frac{1}{2}$	"
20	Oderbruch..........	" 19	" 20.	92	38—40	"	$3-3\frac{1}{2}$	26	2	51	"
21	Lytton..........	" 19	" 23.	95	35—37	"	$3\frac{1}{4}-3\frac{3}{4}$	26	2	50	Slightly.
22	Common..........	" 19	" 17.	89	36—38	Medium..	$2\frac{1}{2}-3$	26	2	$50\frac{1}{2}$	No rust.
23	Trooper..........	" 19	" 19.	91	38—40	Stiff......	$2\frac{1}{2}-3$	25	10	51	"
24	Summit..........	" 19	" 18.	90	36—38	"	$2\frac{1}{2}-3$	25	10	$51\frac{3}{4}$	"
25	Phoenix..........	" 19	" 18.	90	38—40	"	$2\frac{1}{2}-3\frac{1}{4}$	25	10	$50\frac{1}{2}$	"
26	Chinese Hulless...	May 3	" 27.	85	23—25	"	$2\frac{1}{2}-3$	24	28	$60\frac{1}{2}$	"
27	Salzer's Silver King	" 3	" 27.	85	29—31	"	$2\frac{3}{4}-3\frac{1}{4}$	24	28	47	"
28	Baxter..........	April 19	" 17.	89	36—38	Medium..	$2-2\frac{1}{2}$	24	18	$51\frac{1}{2}$	"
29	Hordeum Chousk (Hulless).......	May 3	" 22.	80	22—24	" ..	$3-3\frac{1}{2}$	23	26	$57\frac{1}{2}$	"
30	Empire..........	April 19	" 18.	90	39—41	Stiff......	$2\frac{1}{2}-3$	22	34	52	"
31	Argyle..........	" 19	" 18.	90	37—39	"	$2\frac{1}{2}-3$	21	42	50	"
32	Brome..........	" 19	" 19	91	36—38	Medium..	$2\frac{1}{2}-3$	21	42	$52\frac{1}{2}$	"
33	Excelsior..........	" 19	" 19.	91	36—38	Stiff......	$3-3\frac{1}{2}$	17	34	$48\frac{1}{2}$	"
34	Success..........	May 17	Aug. 2.	77	29—31	"	$2\frac{1}{2}-3$	16	12	47	"
35	Sisolsk Spring No. 2962..........	April 17	July 22.	96	37—39	"	$3\frac{1}{2}-4$	16	2	$47\frac{1}{2}$	"
36	Blue Short Head..	May 3	Aug. 14.	103	19—21	"	$2-2\frac{1}{4}$	11	12	$41\frac{1}{2}$	Badly.
37	Hulless Black.....	April 19	July 19.	91	27—29	Medium..	$2-2\frac{1}{2}$	9	38	$62\frac{1}{2}$	No rust.
38	Hulless White....	" 19	" 22.	94	30—32	" ..	$2-2\frac{1}{2}$	6	2	$60\frac{1}{2}$	"

Among the six-rowed barleys there are five new sorts this year. Princess Sialof from Germany. No. 8 from Norway, and Chinese Hulless, Hordeum Chousk and Sisolsk Spring, No. 2962, from the United States Department of Agriculture, Washington.

There are also included in the above list the following nineteen hybrid sorts, all of which have been produced at the experimental farms:—Albert, Argyle, Brome, Claude, Empire, Garfield, Lytton, Munro, Nugent, Parkin, Phœnix, Pioneer, Royal, Stella, Success, Summit, Trooper, Vanguard and Yale.

SELECT LIST OF VARIETIES OF SIX-ROWED BARLEY.

In this list is given the average yield per acre obtained during the past three to seven years from the most productive sorts grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. Particulars as to how these select lists have been made up will be found under 'Select list of oats.'

Number.	Names of Varieties.	Number of Years under trial.	Average yield per acre at all the Experimental Farms. Bush.	Lbs.
1	Mensury	7	51	29
2	Claude	3	50	44
3	Mansfield	4	48	44
4	Odessa	7	48	19
5	Argyle	4	48	11
6	Yale	3	47	35
7	Trooper	7	47	4
8	Common	7	46	38
9	Royal	7	46	32
10	Oderbruch	7	45	35
11	Albert	3	45	28
12	Garfield	3	45	20
13	Baxter	7	45	3
14	Nugent	7	44	32
15	Petschora	7	44	3
16	Rennie's Improved	7	44	3
17	Summit	7	43	41
18	Stella	7	43	43
19	Brome	3	43	40
20	Empire	4	43	12
21	Pioneer	7	42	45
22	Blue Long Head	5	42	38
23	Phœnix	7	42	22
24	Vanguard	7	42	20
25	Excelsior	6	42	15
26	Empire	7	42	5
27	Champion	6	42	4
28	Hulless Black	3	40	45
29	Success	7	38	42
30	Hulless White	3	37	30

EXPERIMENTS WITH FALL WHEAT.

Twenty varieties of fall wheat were under test during the past season. All but two were sown on September 7 on a piece of light, sandy loam, of good quality, on plots of one-fortieth of an acre each. The previous crop was rape, which was fed off early so as to permit of the land being worked well before sowing. It was ploughed from 6 to 7 inches deep, and well harrowed to bring it into a good condition of tilth. It was manured in the spring of 1900, before sowing the rape with about 20 tons of barnyard manure per acre. The sowing of two of the varieties, Dawson's Golden Chaff and Surprise, was repeated on October 1, but it will be seen that the earlier sowings have produced the largest crops. All the varieties came through the winter well, and made a very strong and even growth and gave good returns. This grain was sown at the rate of $1\frac{3}{4}$ bushels of seed per acre.

FALL WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.		Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
					Inches.		Inches.		Bush.	Lbs.	Lbs.	
1	Gold Coin.....	July	13	309	50—52	Medium.	2½—3	Beardless.	52	15	62	Slightly.
2	Dawson's Golden Chaff	"	13	309	53—55	Stiff	3 —3½	" .	49	30	62	"
3	Early Red Clawson ..	"	13	309	56—58	"	3 —3½	" .	49	2	60½	"
4	Reliable............	"	13	309	54—56	Medium..	3 —3½	Bearded..	47	12	63½	"
5	Jones' Winter Fife...	"	15	311	54—56	Stiff	4 —4½	Beardless.	45	50	62½	No rust.
6	Buda Pesth.........	"	13	309	46—48	"	2½—3	Bearded..	44	—	62½	"
7	Imperial Amber	"	17	313	52—54	Medium..	3½—4	" ..	44	—	61½	"
8	Golden Cross........	"	15	311	50—52	" .	2½—3	" ..	43	5	62¼	Slightly.
9	Surprise.	"	13	309	48—50	Very stiff.	3 —3½	Beardless.	42	10	61½	No rust.
10	Red Velvet Chaff....	"	15	311	52—54	Stiff ...	3 —3½	" .	40	20	62½	Slightly.
11	Egyptian Amber.....	"	17	313	48—50	"	3 —3½	Bearded..	40	20	62½	"
12	American Bronze	"	13	309	47—49	Very stiff.	3½—4	Beardless.	39	25	62½	"
13	Pride of Illinois... ..	"	17	313	53—55	Stiff	3 —3½	" .	38	30	62½	"
14	Velvet Chaff	"	13	309	52—54	"	2½—3	Bearded..	38	30	62½	No rust.
15	Bonnell..............	"	13	309	54—56	"	3 —3½	Beardless.	38	2	62	"
16	Poole..	"	13	309	48—50	Medium..	2½—3	" .	37	35	62½	"
17	Treadwell	"	17	313	50—52	" ..	3 —3½	Bearded..	37	35	62	Slightly.
18	Tasmania Red.... ..	"	17	313	48—50	Weak	2 —2½	" ..	34	22	62	No rust.
19	Turkey Red..........	"	17	313	45—47	"	2½—3	" ..	32	33	62½	"
20	Long Berry Red	"	13	309	46—48	Medium..	2½—3	" ..	32	5	63	"
21	Dawson's Golden Chaff	* "	17	313	45—47	Stiff	3 —3½	Beardless.	35	20	....	"
22	Surprise......... ...	* "	17	313	41—43	" . . .	3 —3½	" .	26	—	....	"

*Both these varieties were sown October 1st. It will be seen that the same varieties sown September 10th produced larger crops.

EXPERIMENTS WITH SPRING WHEAT.

One hundred and seventeen varieties of spring wheat were included in the trial plots in 1901. The soil was a mixed clay and sandy loam, in some parts the clay predominated, in others it was more sandy. The previous crop was field roots. The land received a dressing of fresh barn-yard manure, of about twelve tons per acre, during the winter of 1899-1900 which was put on the frozen ground in small heaps of about one-third of a cart load each and spread and ploughed under in the spring. No manure has been applied since. In the autumn of 1900 the roots were gathered, the land was ploughed about seven inches deep, and left in that condition until the following spring when it was cultivated twice with a two-horse cultivator and harrowed twice with the smoothing harrow before the wheat was sown.

The size of the plots was one-fortieth of an acre each, and they were all sown at the rate of one bushel and a half of seed per acre.

SPRING WHEAT—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
					Inches.		Inches.		Bush.	Lbs.	Lbs.	
1	Goose	Aug.	6	110	44—46	Stiff.	2 —2½	Bearded.	33	50	64½	No rust.
2	Hastings	July	28	101	44—46	″	3 —3½	Beardless.	33	50	60	″
3	Huron	″	31	104	46—48	″	3½—4	Bearded.	32	..	61	″
4	Herisson Bearded	Aug.	1	105	44—46	″	2 —2½	″	32	..	64½	″
5	White Fife	″	6	110	52—54	″	4 —4¼	Beardless.	31	10	59	Slightly.
6	Beaudry	″	6	110	48—50	Medium.	3¾—4¼	Bearded.	29	50	61	″
7	No. 19, Australian	″	8	112	43—45	Stiff.	3¼—3¾	Beardless.	29	10	59	″
8	Red Fife	″	5	109	49—51	″	3¼—4	″	29	10	59½	″
9	Hungarian	″	1	105	42—44	Medium.	3½—4	Bearded.	29	10	61	″
10	Preston	July	31	104	40—42	″	3½—4	″	28	40	58	No rust.
11	No. 181, Minnesota	Aug.	1	105	48—50	Stiff.	3 —3½	Beardless.	28	40	61½	″
12	Beauty	″	7	111	46—48	″	4 —4½	″	28	30	56½	Considerably.
13	No. 5642, Washington	″	8	104	44—46	Medium.	2¼—3	Bearded.	28	30	62	Slightly.
14	Dion's	″	7	111	46—48	Stiff.	4 —4½	″	27	50	60½	″
15	Campbell's White Chaff	″	2	106	50—52	″	3½—4	Beardless.	27	50	58	No rust.
16	Plumper	July	31	104	44—46	″	3½—4	Bearded.	27	20	63	Slightly.
17	No. 15, Australian	Aug.	11	104	46—48	″	2¾—3¼	Beardless.	27	10	60	Considerably.
18	Kingsford	″	5	98	44—46	″	3 —3½	″	27	10	59	Slightly.
19	No. 13, Australian	″	9	113	45—47	″	3½—4¼	″	27	10	59	Considerably.
20	No. 10, Australian	″	7	111	45—47	″	4 —4½	″	26	30	59	″
21	Clyde	July	31	104	48—50	″	4 —4½	″	26	30	60	No rust.
22	Crown	Aug.	1	105	40—42	″	3½—4	Bearded.	26	30	59½	″
23	Boyle	″	6	99	51—53	Medium.	3½—4	Beardless.	26	30	58½	Considerably.
24	No. 5644, Washington	″	7	105	40—42	Stiff.	1¾—2¼	Bearded.	26	30	63	Slightly.
25	Nixon	″	8	101	46—48	″	3½—4	Beardless.	26	30	60	″
26	No. 5639, Washington	″	8	104	42—44	″	2 —2¼	Bearded.	25	50	62	″
27	Perron (Les Eboulements)	″	6	99	45—47	″	3½—4	Beardless.	25	50	58	Considerably.
28	Old Red River	″	11	104	47—49	Medium.	3¾—4¼	″	25	10	60½	Badly.
29	Rio Grande	″	7	111	49—51	Stiff.	3¾—4¼	Bearded.	25	10	61	Slightly.
30	Blenheim	″	1	105	41—43	Medium.	3½—4	″	24	40	60½	No rust.
31	Grant	″	8	101	44—46	Stiff.	3 —3½	Beardless.	24	30	60	Slightly.
32	No. 1, Australian	″	12	105	46—48	″	3¼—3¾	″	24	30	60	″
33	Emporium	″	9	103	49—51	Medium.	4 —4¼	Bearded.	24	10	60	Considerably.
34	Percy	July	31	104	46—48	Stiff.	4 —4½	Beardless.	24	..	60	No rust.
35	Chester	Aug.	1	105	39—41	″	3½—4	″	23	50	61	″
36	Tracey	″	11	104	49—51	″	3½—4¼	″	23	50	59	Considerably.
37	No. 169, Minnesota	″	2	106	42—44	″	3½—4	″	23	20	60	No rust.
38	Pringle's Champlain	July	31	104	41—43	″	3½—4	Bearded.	23	20	61½	″
39	No. 163, Minnesota	Aug.	2	106	42—44	″	3 —3½	Beardless.	23	20	59	″
40	Wellman's Fife	″	6	110	52—54	″	4 —4¾	″	23	10	59	Considerably.
41	No. 27, Australian	″	6	110	49—51	″	3¾—4¼	″	23	10	57	Slightly.
42	Steinmedal fr. Victoria, Aust	″	7	103	40—42	″	3 —3½	″	23	10	56	Considerably.
43	Cartier	″	1	105	40—42	″	3 —3½	Bearded.	23	10	60½	No rust.
44	Roumanian	″	7	111	42—44	″	3 —3½	″	23	10	63¼	Slightly.
45	Early Riga	July	21	91	42—44	″	3 —3½	Beardless.	22	40	61	″
46	Prospect	Aug.	6	99	46—48	″	3 —3½	″	22	30	57	″
47	Dayton	″	5	98	45—47	″	3¼—4	Bearded.	22	30	58	″
48	Red Fern	″	2	106	46—48	″	4½—5	″	22	30	62½	No rust.
49	Colorado	″	1	105	46—48	Medium.	3½—4	″	22	..	62	″
50	Dawn	July	31	104	40—42	Stiff.	4 —4½	Beardless.	22	..	59	″
51	Captor	Aug.	1	105	43—45	″	3½—4	″	22	..	60½	Slightly.
52	Rideau	″	1	105	43—45	″	3½—4	″	22	..	58¾	No rust.
53	No. 5645, Washington	″	9	105	45—47	″	2¼—2¾	Bearded.	21	50	62½	Badly.
54	No. 12, Australian	″	5	98	39—41	″	3¼—4	Beardless.	21	50	58	Slightly.
55	No. 23, Australian	″	7	111	47—49	″	4 —4¾	″	21	50	58	″
56	Speltz	″	7	111	36—38	Medium.	2 —2¼	Bearded.	21	50	40	″
57	Lakefield	″	6	99	46—48	″	3½—4	Beardless.	21	10	57	Badly.
58	Laurel	″	8	112	48—50	Stiff.	3¾—4¼	″	21	10	59	Considerably.
59	Morley	″	8	101	42—44	″	4 —4½	″	21	10	58	Slightly.
60	White Connell	″	8	112	42—44	″	3½—4¼	″	21	10	59½	″
61	White Russian	″	7	111	47½-48½	″	4¼—5	″	21	10	59	″
62	Admiral	″	8	112	44—46	″	3¼—4	″	21	10	58	Considerably.
63	No. 5646, Washington	″	7	103	38—40	″	2 —2¼	Bearded.	21	10	62½	″
64	No. 2, Australian	″	12	105	46—48	″	3¾—4¼	Beardless.	20	50	60	″

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

Number.	Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.	Rusted.
				Inches.		Inches.		Bush.	Lbs.	Lbs.	
65	Alpha	Aug. 1	105	42—44	Stiff	4 —4½	Beardless.	20	40	61	No rust.
66	Robin's Rust Proof..	" 8	112	49—51	"	3¾—4	" .	20	40	58½	Considerably.
67	Benton....	" 1	105	41—43	"	3½—4	" .	20	40	62	Slightly.
68	Advance	July 31	104	41—43	"	3 —3½	Bearded. .	20	40	61¼	No rust.
69	Monarch	Aug. 6	110	46—48	"	4¼—4¾	Beardless.	20	30	59	Slightly.
70	No. 11, Australian...	" 11	104	45—47	"	3¾—4¼	" .	20	30	57½	Considerably.
71	Orleans	" 8	101	48—50	"	3½—4	" .	20	30	59	Slightly.
72	Blair........	" 1	105	40—42	"	3 —3½	" .	20	—	63½	"
73	Countess	" 2	106	46—48	"	3 —3½	" .	20	—	60½	No rust.
74	Red Swedish.. .. .	" 7	111	48—50	"	4 —4¾	Bearded..	19	50	58	Slightly.
75	From Kerr Gifford, Portland, O.......	" 7	103	36—38	"	1½—1¾	Beardless.	19	50	56	Badly.
76	Newdale...........	" 5	98	39—41	"	3 —3½	" .	19	50	59	Slightly.
77	Robson............	" 6	99	49—51	"	4 —4½	" .	19	50	56	Considerably.
78	Redpath	" 8	101	48—50	"	4 —4½	" .	19	50	...	Slightly.
79	Spence	" 5	98	45—47	"	3 —3½	Bearded..	19	50	57	"
80	Progress	July 28	101	44—46	"	4 —4½	Beardless.	19	50	58	No rust.
81	No. 25, Australian...	Aug. 7	111	48—50	"	4½—5	" .	19	50	56	Considerably.
82	Dawson	" 12	105	48—50	Medium..	3¾—4¼	" .	19	50	59½	"
83	No. 149, Minnesota..	" 2	106	43—45	Stiff	3 —3½	" .	19	40	62	Slightly.
84	Harold	July 21	94	42—44	"	2½—3	Bearded..	19	40	61½	"
85	No. 9, Australian....	Aug. 2	106	42—44	"	3½—4	" .	19	30	58	Considerably.
86	Stanley	July 31	104	39—41	"	3½—4	Beardless.	19	20	60	No rust.
87	Norval.....	" 28	101	42—44	"	3 —3½	Bearded..	19	20	61½	"
88	No. 28, Australian...	Aug. 6	99	42—44	"	3½—4	Beardless.	19	10	58	Slightly.
89	Dufferin..........	" 1	105	41—43	"	3 —3½	Bearded..	19	10	60	No rust.
90	Florence......	" 6	99	47—49	"	3½—4	Beardless.	19	10	61	Slightly.
91	Essex	" 8	112	45—47	"	3¾—4¼	" .	19	10	58	"
92	Crawford.:........	July 28	101	42—44	"	3½—4	" .	19	—	61	No rust.
93	Fraser	" 22	95	39—41	"	3 —3½	Bearded..	18	40	62½	"
94	Angus.............	Aug. 1	105	45—47	"	3 —3½	Beardless.	18	40	60	Slightly.
95	Weldon	" 1	105	42—44	"	3½—4	" .	18	40	61	No rust.
96	Polonian	" 9	102	41—43	Medium..	5½—6	Bearded..	18	30	56	Considerably.
97	No. 5643, Washington....	" 7	105	37—39	" ..	2¾—3¼	" .	17	50	61	Slightly.
98	Byron	July 31	104	39—41	Stiff......	3 —3½	" .	17	50	59¼	No rust.
99	Japanese	" 24	97	36—38	"	3 —3½	" .	17	20	61	Slightly.
100	Cassel..	Aug. 8	112	43—45	"	3¾—4¼	Beardless.	17	10	58	"
101	Vernon	" 1	105	39—41	"	3½—4	Bearded..	17	10	59	No rust.
102	No. 21, Australian...	" 6	99	40—42	"	3½—4	Beardless.	17	10	59	Considerably.
103	Summer No. 9, Norway.............	July 28	93	36—38	"	3 —3½	" .	17	10	52	Slightly.
104	Mason.....	Aug. 1	105	39—41	Medium..	3 —3½	" .	16	40	62	"
105	No. 18, Australian...	" 11	104	39—41	Stiff......	2¾—3¼	" .	16	30	60½	Considerably.
106	Strubes	" 7	100	42—44	"	3½—4½	Bearded..	16	30	60¼	Slightly.
107	Gehun.............	" 2	93	42—44	"	2½—3	" .	16	30	59½	"
108	Ebert	July 22	95	38—40	Medium..	2½—3	Beardless.	15	20	63	"
109	No. 5799, Washington...............	Aug. 9	105	41—43	" ..	5½—6	Bearded..	15	10	56	Considerably.
110	No. 7, Felbrig Australian....	" 8	101	45—47	Stiff	3¾—4½	Beardless.	15	10	58	"
111	Ladoga	July 27	100	35—37	"	3 —3½	Bearded..	14	40	57	No rust.
112	Bishop	Aug. 1	105	39—41	"	3½—4	Beardless.	13	50	60	"
113	Powell	" 8	96	41—43	"	3 —3½	" .	13	10	57	Slightly.
114	No. 14, Australian. .	" 8	101	39—41	"	3¼—4	" .	13	10	59	"
115	Leutewitzer Sand...	" 5	98	37—39	"	3½—4	Bearded..	13	10	58¼	"
116	Black Sea	" 2	95	38—40	"	3 —3½	" .	13	10	55¼	"
117	No. 2959, Washington.............	" 7	103	39—41	"	2½—3	" .	13	10	61½	"

In the foregoing list there are a number of new varieties including four new sorts from Prof. W. U. Hays, Agriculturist of the Minnesota Experiment Station. These have been sent out under numbers. There are also some additional varieties from Australia under numbers. From the United States Department of Agriculture the following have been received:—Nos. 5642, 5644, 5639, 5645, 5646, 5643, 5799 and 2599.

There are also included in this list fifty-four cross-bred sorts which have been originated at the experimental farms. The names of these are Admiral, Advance, Alpha, Angus, Beauty, Benton, Bishop, Blair, Blenheim, Boyle, Byron, Captor, Cartier, Cassel, Chester, Clyde, Countess, Crawford, Crown, Dawn, Dawson, Dayton, Dufferin, Early Riga, Ebert, Essex, Florence, Fraser, Grant, Harold, Hastings, Huron, Kingsford, Lakefield, Laurel, Mason, Morley, Newdale, Nixon, Norval, Orleans, Percy, Plumper, Powell, Preston, Progress, Prospect, Redpath, Robson, Spence, Stanley, Tracey, Weldon and Vernon.

The origin and parentage of all these, excepting thirteen, will be found in the annual reports for 1896-7-8 and 1900.

The thirteen now added are the following:—

No. 46. Dayton, bearded. Prince, female; Hard Red Calcutta, male.

No. 47. Grant, beardless. Alpha, female; Gehun, male.

No. 48. Kingsford, beardless. Red Fife, female ; Gehun, male.

No. 49. Lakefield, beardless. Campbell's White Chaff, female; Ladoga, male.

No. 50. Morley, beardless. Red Fife, female; No. 1 Club Bombay, male.

No. 51. Newdale, beardless. Gehun, female; Campbell's White Chaff, male.

No. 52. Nixon, beardless. Onega, female; Red Fife, male.

No. 53. Orleans, beardless. Red Fife, female; Campbell's White Chaff, male.

No. 54. Prospect, beardless. Rideau, female; Red Fife, male.

No. 55. Robson, beardless. White Fife, female; Hard Red Calcutta, male.

No. 56. Redpath, beardless. Red Fife, female; Campbell's White Chaff, male.

No. 57. Spence, bearded. Alpha, female; Hard Red Calcutta, male.

No. 58. Tracey, beardless. Silver Chaff, female; Anglo-Canadian, male.

Of these results in cross-fertilizing two are bearded varieties and eleven are beardless. Four of these were originated at the Central Experimental Farm by the Director, Nos. 49 and 58 in 1890, and Nos. 48 and 51 in 1892. One by Dr. C. E. Saunders in 1896, No. 54; three by Mr. W. T. Macoun in 1892, Nos. 46, 52 and 57, and one by Mr. J. L. McMurray in 1890, No. 50. Four were originated by Dr. A. P. Saunders in 1892, two of them, Nos. 53 and 55 at the Experimental Farm at Brandon, Manitoba; one, No. 56, at the farm at Indian Head, N.W.T., and one, No. 47, at the farm at Agassiz, British Columbia.

SELECT LIST OF VARIETIES OF SPRING WHEAT.

In this list is given the average yield per acre obtained during the past three to seven years from the most productive varieties of spring wheat grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. The bearded and beardless sorts are also marked. Further particulars regarding these select lists will be found under 'Select list of oats.'

Number.	Names of varieties.	Head Bearded or Beardless.	Number of Years under trial.	Average Yield per acre at all the Experimental Farms. Bush.	Lbs.
1	Roumanian	Bearded	3	39	44
2	Laurel	Beardless	3	35	38
3	Preston	Bearded	7	33	58
4	Wellman's Fife	Beardless	7	33	8
5	Monarch	"	7	33	8
6	Goose	Bearded	7	32	50
7	Huron	"	7	32	45
8	Red Fife	Beardless	7	32	30
9	White Fife	"	7	32	29
10	Hungarian	Bearded	6	32	10
11	White Connell	Beardless	7	32	6
12	White Russian	"	7	32	6
13	Rio Grande	Bearded	7	32	6
14	Clyde	Beardless	3	32	6
15	Crawford	"	3	32	3
16	Pringle's Champlain	Bearded	7	31	56
17	Red Fern	"	7	31	31
18	Crown	"	7	31	21
19	Stanley	Beardless	7	31	19
20	Blair	Bearded	4	31	7
21	Advance	"	7	30	58
22	Alpha	Beardless	7	30	53
23	Percy	"	7	30	24
24	Admiral	"	7	30	23
25	Fraser	Bearded	3	30	16
26	Blenheim	"	7	30	12
27	Weldon	Beardless	3	30	12
28	Red Swedish	Bearded	3	30	12
29	Progress	Beardless	6	30	5
30	Ebert	"	3	30	5
31	Vernon	Bearded	6	29	59
32	Dion's	"	7	29	53
33	Colorado	"	7	29	50
34	Countess	Beardless	6	29	48
35	Plumper	Bearded	4	29	40
36	Herisson Bearded	"	7	29	40
37	Mason	Beardless	4	29	38
38	Early Riga	"	3	29	36
39	Beauty	"	6	29	35
40	Dawn	"	6	29	30
41	Rideau	"	7	29	22
42	Campbell's White Chaff	"	7	29	16
43	Beaudry	Bearded	7	29	3
44	Byron	"	3	28	56
45	Dufferin	"	6	28	39
46	Captor	Beardless	7	28	7
47	Norval	Bearded	3	27	24
48	Ladoga	"	7	27	11
49	Harold	"	4	26	39

GRAIN SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY AND CLAY LOAM.

These experiments were all conducted on plots of one-fortieth acre each on both sandy loam and clay loam. It will be noticed that the crops are heaviest on the clay loam in every instance.

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Rusted.
				Inches.		Inches.		Bus.	Lbs	
WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.										
Preston 1 bush per acre........	April 29	Aug. 7	100	45—47	Stiff......	3½—4	Bearded...	10	20	Slightly.
Preston 1¼ bush. per acre........	" 29	" 7	100	45—47	"	3½—4	" ...	15	—	"
Preston 1½ bush. per acre..	" 29	" 7	100	45—47	"	3½—4	" ...	19	40	"
Preston 2 bush. per acre.......	" 29	" 7	100	45—47	"	3½—4	" ...	20	20	"
Preston 2½ bush. per acre.......	" 29	" 7	100	42—44	Medium..	3 —3½	" ...	21	—	"
Preston 3 bush. per acre.......	" 29	" 7	100	42—44	" ..	3 —3½	" ...	19	40	"
WHEAT SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.										
Preston 1 bush. per acre.... ...	" 27	" 2	97	48—50	Stiff....	3½—4	" ...	28	20	"
Preston 1¼ bush. per acre.,... ..	" 27	" 2	97	48—50	"	3½—4	" ...	28	20	"
Preston 1½ bush. per acre.......	" 27	" 2	97	48—50	"	3½—4	" ...	29	—	"
Preston 2 bush. per acre.......	" 27	" 2	97	48—50	Medium..	3½—4	" ...	26	20	Considerably.
Preston 2½ bush. per acre..	" 27	" 2	97	48—50	" ..	3½—4	" ...	26	20	"
Preston 3 bush. per acre.......	" 27	" 2	97	48—50	Weak	3 —3½	" ...	25	—	"
OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.										
Banner 1½ bush. per acre........	" 29	" 3	96	42—44	Stiff......	8 —9	Branching.	41	6	Slightly.
Banner 2 bush. per acre..	" 29	" 3	96	42—44	"	8 —9	" .	59	14	"
Banner 2½ bush. per acre.. ..	" 29	" 3	96	40—42	Medium..	8 —9	" .	57	2	"
Banner 3 bush. per acre..... .	" 29	" 3	96	40—42	" ..	8 —9	" .	43	18	"
Banner 3½ bush. per acre........	" 29	" 3	96	30—32	Weak	7 —8	" .	31	26	"
Banner 4 bush. per acre.......	" 29	" 3	96	30—32	"	7 —8	" .	35	10	"
OATS SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.										
Banner 1½ bush. per acre..... .	" 27	July 28	92	46—48	Stiff......	9—10	" .	58	28	"
Banner 2 bush. per acre........	" 27	" 28	92	46—48	"	9—10	" .	65	30	"
Banner 2½ bush. per acre.......	" 27	" 28	92	49—51	"	9—10	" .	67	2	"
Banner 3 bush. per acre..	" 27	" 28	92	49—51	Medium..	9—10	" .	64	24	"
Banner 3½ bush. per acre........	" 27	" 28	92	40—42	" ..	9—10	" .	61	6	"
Banner 4 bush. per acre........	" 27	" 28	92	34—36	Weak . ..	9—10	" .	57	22	"

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Rusted.
				Inches.		Inches.		Bus.	Lbs	
BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM SOIL.										
Mensury 1½ bush. per acre.......	" 29	" 22	84	39—41	Stiff......	3 —3½	....	35	35	None.
Mensury 2 bush. per acre.......	" 29	" 22	84	39—41	"	3 —3½	....	37	19	"
Mensury 2½ bush. per acre.......	" 29	" 22	84	39—41	Medium..	3 —3½	....	43	11	"
Mensury 3 bush. per acre.......	" 29	" 22	84	39—41	" ..	3 —3½	....	42	19	"
Mensury 3½ bush. per acre.......	" 29	" 22	84	39—41	" ..	3 —3½	....	39	23	"
Mensury 4 bush. per acre.......	" 29	" 22	84	36—38	" ..	3 —3½	....	43	11	"
BARLEY SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM SOIL.										
Mensury 1½ bush. per acre.......	" 27	" 19	83	39—41	Stiff......	3 —3½	....	37	—	"
Mensury 2 bush. per acre.......	" 27	" 19	83	39—41	"	3 —3½	....	40	35	"
Mensury 2½ bush. per acre.......	" 27	" 19	83	43—45	"	3 —3½	....	44	3	"
Mensury 3 bush. per acre.......	" 27	" 19	83	41—43	Medium..	3 —3½	....	45	35	"
Mensury 3½ bush. per acre.......	" 27	" 19	83	40—42	Weak	3 —3½	....	45	35	"
Mensury 4 bush. per acre.......	" 27	" 19	83	40—42	"	3 —3½	....	44	3	"

EXPERIMENTS WITH PEASE.

Sixty-one varieties of pease have been under trial in the uniform test plots during the past season. The soil on which these pease were sown was a sandy loam, which received a dressing of barn-yard manure during the winter of 1898-9 of about 12 tons per acre. The previous crop was oats. After the oats were taken off the land was cultivated shallow shortly after harvest to start shed grain and weed seeds, and ploughed again later in the autumn about 8 inches deep, and left in this condition until the following spring, when it was cultivated twice with a two-horse cultivator and twice with a smoothing harrow. The seed of all the varieties was sown on April 29 on plots of one-fortieth of an acre each, at the rate of two to three bushels per acre according to the size of the pea.

PEASE—TEST OF VARIETIES.

Number.	Name of Variety.	Date of Ripening.	No. of days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Yield per Acre.		Weight per Bushel.
					Inches.	Inches.	Bush.	Lbs.	Lbs.
1	Cooper	Aug. 15	108	Strong	74—80	2¼—2½	33	20	61½
2	English Gray	" 15	108	"	75—80	2¼—2¾	32	..	59
3	Paragon	" 2	95	"	35—40	1¾—2¼	32	..	61
4	Nelson	" 6	99	"	50—55	2¼—2¾	32	..	61½
5	French Canner	" 12	105	Medium	90—96	2¼—3	31	40	61
6	Bruce	" 18	111	Very strong	70 75	2½—2¾	31	40	61½
7	Centennial	" 20	113	Medium	65—70	2¼—2¾	31	20	61
8	Vincent	" 20	113	Strong	70—75	2½—2¾	30	40	61
9	Elder	" 14	107	"	75—80	2 —2¼	30	40	61½
10	Chancellor	" 3	96	"	65—70	1½—2	30	40	62½
11	Kent	" 14	107	Very strong	65—70	2½—2¾	30	40	62
12	Victoria	" 21	114	"	70—75	2¼—2¾	30	..	61½
13	Carleton	" 14	107	"	80—85	2¼—2¾	30	..	62½
14	Alma	" 14	107	Medium	65—70	2¼—3	30	..	61
15	Arthur	" 15	108	Very strong	60—65	2¼—2¾	30	..	61
16	Elliot	" 13	106	"	65—70	2¼—2¾	30	..	62
17	King	" 18	111	Strong	75—80	2¼—2¾	29	20	61
18	Canadian Beauty	" 13	106	Very strong	72—76	2½—3	29	20	60½
19	Picton	" 15	108	"	72—78	2 —2¼	29	20	61½
20	Golden Vine	" 13	106	Strong	70—75	2 —2¼	29	..	62½
21	Lanark	" 12	105	"	76—82	2½—2¾	29	..	60
22	Bright	" 16	109	"	72—78	2½—2¾	28	..	61½
23	Bedford	" 15	108	Very strong	90—95	2¼—2¾	28	..	62
24	Large White Marrowfat	" 14	107	"	72—78	2¾—3¼	28	..	61
25	Perth	" 14	107	Strong	68—72	2½—2¾	28	..	61
26	Prussian Blue	" 6	99	"	68—75	2½—2¾	27	20	61½
27	Mackay	" 10	103	Very strong	68—72	1¾—2¼	27	20	61½
28	Pride	" 12	105	Strong	65—70	2 —2¼	27	20	62½
29	Mummy	" 15	108	"	70—75	2¼—2¾	27	20	61½
30	Pearl	" 21	114	Medium	60—65	2½—2¾	27	20	62
31	Field Gray	" 16	109	"	65—70	2 —2¼	27	20	62
32	Prince	" 13	106	Strong	70—75	2½—3	26	40	62
33	Daniel O'Rourke	" 5	98	"	55—60	1¾—2¼	26	40	63
34	Creeper	" 12	105	"	68—72	2 —2½	26	40	62½
35	New Potter	" 20	113	Strong	72—78	2¼—2½	26	40	61
36	Wisconsin Blue	" 17	110	"	62—68	2 —2¼	26	..	63
37	Duke	" 15	108	"	57—61	2 —2½	26	..	61½
38	Oddfellow	" 15	108	Very strong	50—55	1¾—2¼	26	..	63
39	Agnes	" 14	107	"	65—70	2½—3	26	..	62
40	Black Eyed Marrowfat	" 19	112	Strong	70—75	2¼—2¾	25	40	60
41	White Wonder	" 7	100	Medium	34—38	2 —2½	25	20	62
42	Archer	" 18	111	Strong	70—75	2¼—2¾	25	..	61½
43	Macoun	" 19	112	"	55—60	2¼—2½	24	40	61½
44	Multiplier	" 19	112	"	72—76	2¼—2½	24	40	61½
45	Gregory	" 11	104	"	70—75	2 —2½	24	40	61
46	Early Britain	" 13	106	"	50—55	2¼—2½	24	40	58½
47	Crown	" 13	106	Medium	70—75	2 —2¼	24	20	63
48	Harrison's Glory	" 11	104	Strong	54—58	2¼—2½	24	..	61½
49	Elephant Blue	" 13	106	Very strong	70—75	2¼—3	24	..	60
50	Prince Albert	" 21	114	Strong	70—75	2¼—2½	24	..	59½
51	Fergus	" 17	110	"	70—75	2¼—2½	24	..	61
52	Chelsea	" 19	112	"	70—75	2 —2¼	23	40	61½
53	Dover	" 15	108	"	57—61	2 —2½	22	40	62
54	Herald	" 20	113	"	65—70	2¼—2¾	21	20	61½
55	Fenton	" 10	103	"	72—76	2¼—2¾	20	.	59
56	Trilby	" 12	105	"	62—68	2¼—2¾	19	20	61½
57	Maple	" 21	114	"	68—72	2¼—2½	18	40	58½
58	German White	" 7	100	"	70—75	1¾—2½	18	20	61
59	Grass Pea	" 21	114	"	55—60	1 —1¼	16	40	63½
60	Grey (Pisum Arvense, No. 13 fr. Norway)	" 6	99	Medium	36—38	¾—1¼	12	..	61½
61	Marrowfat (fr. Norway)	" 5	98	"	46—48	2 —2¼	8	..	58½

The foregoing list includes the following thirty cross-bred sorts, all of which have been originated at the experimental farms:—Agnes, Alma, Archer, Arthur, Bedford, Bright, Bruce, Carleton, Chelsea, Cooper, Dover, Duke, Elder, Elliot, Fenton, Fergus,

Gregory, Herald, Kent, King, Lanark, Mackay, Macoun, Nelson, Pearl, Perth, Picton, Prince, Trilby and Vincent.

SELECT LIST OF VARIETIES OF PEASE.

In this list is given the average yield per acre obtained during the past three to seven years from the most productive varieties of pease grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. Further particulars regarding these select lists will be found under 'Select list of oats.'

Number.	Names of Varieties.	Number of Years under trial.	Average Yield per acre at all the Experimental Farms.	
1	Crown	7	36	40
2	German White	4	36	1
3	Pride	7	36	
4	Carleton	6	35	36
5	Picton	4	35	31
6	Chelsea	3	35	15
7	Early Britain	5	34	53
8	King	5	34	36
9	New Potter	7	34	30
10	Paragon	6	34	26
11	Duke	6	34	23
12	English Gray	3	34	15
13	Lanark	4	34	12
14	Pearl	3	34	10
15	Wisconsin Blue	3	34	2
16	Perth	5	33	53
17	Agnes	6	33	52
18	Archer	5	33	50
19	Gregory	4	33	42
20	Elliot	3	33	42
21	Arthur	6	33	37
22	Mummy	7	33	36
23	Fergus	4	33	30
24	Trilby	6	33	27
25	Chancellor	5	33	25
26	White Wonder	5	33	25
27	Centennial	7	33	21
28	Nelson	5	33	19
29	Bruce	3	33	14
30	Kent	6	33	9
31	Prussian Blue	5	33	5
32	Victoria	5	33	3
33	Prince Albert	7	32	58
34	Golden vine	7	32	58
35	Mackay	6	32	41
36	Prince	6	32	40
37	Dover	3	32	39
38	Black Eyed Marrowfat	7	32	37
39	Macoun	6	32	36
40	Vincent	5	32	24
41	Creeper	6	32	23
42	Oddfellow	5	32	18
43	French Canner	4	32	15
44	Elder	3	32	10
45	Bright	5	31	59
46	Large White Marrowfat	6	31	45
47	Fenton	4	31	44
48	Canadian Beauty	7	31	41
49	Elephant Blue	5	31	38
50	Daniel O'Rourke	6	31	35
51	Cooper	4	31	30
52	Alma	5	31	29
53	Bedford	6	31	25
54	Herald	3	31	15
55	Multiplier	7	31	3
56	Harrison's Glory	5	30	57

EXPERIMENTS WITH INDIAN CORN.

Thirty-seven varieties of Indian corn were tested during the season of 1900, side by side, on fairly uniform land. The soil was a sandy loam of good quality, which received a dressing of barn-yard manure, about twelve tons to the acre, during the winter of 1900-1. This was placed on the frozen land fresh from the barn-yard, in small heaps of about one-third of a cart load each, and spread and ploughed under in the spring. The previous crop was wheat. The land was gang-ploughed shallow shortly after wheat harvest to start weed seeds and shed grain, and ploughed again in the autumn seven or eight inches deep. In the spring of 1901, after the manure was spread and ploughed under, it was harrowed twice with the smoothing harrow before sowing. The corn was sown with the seed drill, in rows three feet apart, also in hills three feet apart each way; when the plants were from five to seven inches high they were thinned so as to leave them from six to eight inches apart in the rows, and from four to five kernels were left in each hill. The varieties were all sown on May 28, and were cut for ensilage on September 18. The yield per acre has been calculated from the weight of the crop cut from two rows, each 66 feet long.

INDIAN CORN—TEST OF VARIETIES.

Number.	Name of Variety.	Character of Growth.	Height.	Leafiness.	Condition when Cut.	Weight per Acre grown in Rows.		Weight per Acre grown in Hills.	
			Inches.			Tons.	Lbs.	Tons.	Lbs.
1	Superior Fodder	Strong	120—130	Leafy	Glazed	24	840	25	820
2	Early Mastodon	Very strong	120—130	"	Doughy	24	400	24	840
3	Early Butler	"	110—120	Very leafy	Late milk	23	1,300	19	940
4	Thoro'bred White Flint	"	115—120	"	"	23	200	23	640
5	Extra Early Huron	"	115—125	Leafy	"	22	1,760	25	1,480
6	Cloud's Early Yellow	"	120—125	"	"	22	1,540	20	40
7	Giant Prolific Ensilage	"	120—130	"	"	22	1,540	19	1,600
8	Selected Leaming	"	120—130	"	Glazed	22		23	860
9	Red Cob Ensilage	"	120—130	Very leafy	Late milk	22		21	20
10	Evergreen Sugar	Strong	105—115	Leafy	Early milk	21	1,120	18	520
11	Champion White Pearl	Very strong	110—120	"	Late milk	21	460	15	1,020
12	Rennie's B. B.	"	125—130	"	Early milk	21	460	19	940
13	Country Gentleman	Medium	94—110	"	"	20	1,360	16	120
14	Sauford	Strong	120—125		Late milk	19	1,820	17	1,200
15	Salzer's All Gold	Very strong	115—125	"	Early milk	19	1,380	22	440
16	Mammoth Cuban	"	125—135	Very leafy	"	19	940	26	140
17	Canada White Flint	Strong	90—120	Leafy	Late milk	18	1,840	17	100
18	Rennie's Victoria Yellow	Very strong	130—140	"	Glazed	18	1,840	17	100
19	Pride of the North	"	105—115	"	Late milk	18	1,820	11	1,760
20	Compton's Early	Medium	95—105	Leafy	Glazed	18	1,620	14	1,480
21	White Cap Yellow Dent	Very strong	120—130	Very leafy	Early milk	18	1,300	19	500
22	Rennie's Earliest Ontario	Strong	105—115	Medium	"	18	300	20	1,360
23	King of the Earliest	"	105—115	Leafy	Doughy	18	80	18	1,620
24	Mamm. Eight-rowed Flint	Medium	95—105	"	Glazed	17	1,420	22	
25	Black Mexican	"	90—100	"	"	16	1,660	14	1,480
26	Early Yellow Long Eared	"	105—110	"	Ripe	16	1,220	15	1,900
27	Longfellow	Strong	95—105	"	Glazed	15	360	20	40
28	North Dakota White	Medium	90— 95	"	"	14	1,700	19	500
29	Angel of Midnight	Strong	90—102	Fairly leafy	"	14	1,480	15	1,460
30	Pearce's Prolific	"	85— 95	Medium	"	14	1,260	18	520
31	North Dakota Yellow	Medium	80— 90	Leafy	"	14	1,040	18	1,400
32	Kendall's Early Giant	Weak	65— 75	"	Doughy	13	1,280	16	560
33	Early August	"	80— 90	Medium	Ripe	10	240	8	1,160
34	Salzer's Earliest Ripe	"	65— 75	"	"	9	700	10	1,120
35	Extra Early Szekely	"	65— 75	Leafy	"	9	260	11	440
36	Yellow Six Weeks	"	65— 75	Medium	"	9	40	9	1,360
37	Mitchell's Extra Early	"	60— 65	"	"	8	1,600	11	1,100

INDIAN CORN PLANTED AT DIFFERENT DISTANCES.

Three varieties were chosen for this test, the Champion White Pearl, Selected Leaming and Longfellow. They were sown in rows at different distances apart. The

soil was the same as that used for the test of varieties, and its treatment and preparation were the same. The corn was sown with the seed drill on May 28, and was cut for ensilage September 18. Four rows were sown in each ease, and the yield per acre has been calculated from the weight of erop obtained from the two inside rows, each 66 feet long.

Name of Variety.	Width of Row.	Character of Growth.	Height when Cut.	Condition when Cut.	Weight per Acre.	
	Inches.		Inches.		Tons.	Lbs.
Champion White Pearl	21	Strong	120—130	Late milk.	27	665
" "	28	"	120—130	"	26	72
" "	35	Very strong.	125—135	"	24	1,720
" "	42	"	125—135	"	24	1,444
Selected Leaming	21	Strong	115—125	Glazed	24	1,010
"	28	"	115—125	"	20	186
"	35	Very strong.	125—135	"	19	194
"	42	"	125—135	"	21	1,9[illegible]2
Longfellow	21	Strong	95—100	"	20	1,470
"	28	"	95—100	"	19	770
"	35	Very strong.	100—110	"	18	838
"	42	"	100—110	"	17	1,156

SELECT LIST OF VARIETIES OF INDIAN CORN.

In this list is given the average yield per acre obtained during the past three to seven years from the more productive varieties of Indian corn grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. Fuller particulars regarding these select lists will be found under 'Select list of oats.'

Number.	Names of Varieties.	Number of Years under Trial.	Average Yield per Acre at all the Experimental Farms.	
1	Early Mastodon	4	21	690
2	Cloud's Early Yellow	5	19	1,001
3	Red Cob Ensilage	7	19	651
4	Thoroughbred White Flint	7	19	134
5	Selected Leaming	6	18	1,210
6	Early Butler	5	18	958
7	Mammoth Cuban	4	18	626
8	Giant Prolific Ensilage	7	17	1,976
9	Pride of the North	6	17	1,141
10	Champion White Pearl	7	17	1,054
11	Angel of Midnight	7	17	257
12	Mammoth Eight-rowed Flint	7	16	1,536
13	King of the Earliest	6	16	910
14	Sanford	7	16	627
15	Compton's Early	7	16	545
16	White Cap Yellow Dent	7	16	380
17	Evergreen Sugar	4	16	79
18	Longfellow	7	15	1,921
19	Canada White Flint	7	15	1,762
20	Country Gentleman	3	15	1,123
21	North Dakota White	7	15	983
22	Pearce's Prolific	7	15	505
23	Early Yellow Long Eared	3	14	1,837
24	Kendall's Early Giant	3	14	1,737
25	Black Mexican	3	14	1,127
26	Extra Early Huron Dent	7	14	1,004
27	Extra Early Szekely	3	12	789
28	Mitchell's Extra Early	7	11	1,042
29	Yellow Six Weeks	3	10	1,574

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties of turnips were on trial during the past season, all sown side by side on similar land. The soil was a clay loam of good quality, more or less mixed with sandy loam. The previous crop was experimental plots of wheat and barley. The land was ploughed early in the autumn of 1900 about eight inches deep. During the winter of 1900-1 this land received a dressing of about 12 tons of fresh barn-yard manure per acre, which was placed on the frozen ground in small piles of about a third of a cart-load each to prevent fermentation. This was spread in the spring, ploughed under about six inches deep, and harrowed with the smoothing harrow. The land was then made up in drills two feet apart, and rolled with a heavy land roller, which flattened the drills nearly one-half, leaving a firm seed bed. The seed was sown at the rate of three pounds per acre. Two sowings were made of each sort, the first on May 8, the second on May 22. They were also pulled on two different dates. The first pulling was on October 14, and the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet in length.

TURNIPS—TEST OF VARIETIES.

Number.	Name of Variety.	Yield per acre from 1st Sowing 1st Pulling October 14.		Yield per acre from 2nd Sowing 1st Pulling October 14.		Yield per acre from 1st Sowing 2nd Pulling October 28.		Yield per acre from 2nd Sowing 2nd Pulling October 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Carter's Elephant	41	1,820	29	80	43	790	37	910
2	Hartley's Bronze	41	1,490	29	80	42	480	30	1,380
3	Drummond Purple Top	40	520	28	760	40	520	32	680
4	Halewood's Bronze Top	39	1,530	28	430	39	1,200	29	1,730
5	Hall's Westbury	37	1,240	27	1,110	39	1,530	32	1,670
6	Sutton's Champion	37	1,240	28	1,090	32	20	30	60
7	Bangholm Selected	36	1,590	25	1,480	39	210	27	450
8	Emperor Swede	36	270	32	1,670	33	660	24	840
9	Champion Purple Top	34	1,300	27	450	40	190	31	40
10	Prize Purple Top	34	310	23	1,520	31	370	25	490
11	Magnum Bonum	33	1,650	24	1,830	35	950	32	680
12	Marquis of Lorne	33	1,320	27	120	30	1,710	24	840
13	New Arctic	33	990	21	240	34	310	29	1,730
14	Selected Purple Top	33	330	28	1,750	29	80	23	530
15	Skirvings	32	1,340	27	1,110	27	780	21	900
16	West Norfolk Red Top	32	1,340	26	800	27	120	21	240
17	Imperial Swede	32	1,340	22	880	35	1,280	28	1,420
18	Selected Champion	32	1,010	25	1,150	34	310	24	510
19	Shamrock Purple Top	32	20	26	1,790	31	700	24	1,830
20	Elephant's Master	31	1,690	20	1,580	37	580	28	1,750
21	Giant King	31	1,360	26	1,460	41	170	30	720
22	Prize Winner	30	1,380	26	140	29	1,730	24	180
23	East Lothian	30	720	27	1,440	36	270	30	1,050
24	Perfection Swede	30	60	29	1,070	31	1,360	26	1,130
25	Kangaroo	27	120	22	1,870	33	660	26	800
26	Monarch	25	490	22	880	18	1,620	21	900
27	Mammoth Clyde	24	180	22	550	33	990	30	720
28	Jumbo	23	1,850	20	590	33	1,320	25	490
29	Webb's New Renown	16	670	17	1,970	23	200	All rotten.	

	Tons.	Lbs.
The average from the 1st sowing, 1st pulling was	32	1,420
The average from the 2nd sowing, 1st pulling was	25	1,582
The average from the 1st sowing, 2nd pulling was	33	1,896
The average from the 2nd sowing, 2nd pulling was	27	1,381

Increase in Crop of Turnips from early Sowing, also from Late Pulling.

The results given point to the advantage of early sowing. The average yield of turnips from all the varieties from the first sowing and first pulling has exceeded that from the second sowing by 6 tons, 1,838 pounds per acre, and in the case of the second pulling made fourteen days later, the larger weight from the earlier sowing is well maintained, the difference being 6 tons, 515 pounds per acre in favour of early sowing.

The figures given also show that the fourteen days of additional time given to the roots to grow between October 14 and 28, resulted in an average increase in weight in the early sown plots of 1 ton 492 pounds per acre, while those later sown increased in weight during the same period 1 ton 1,799 pounds per acre.

SELECT LIST OF VARIETIES OF TURNIPS.

In this list is given the average yield per acre obtained during the past three to seven years from the more productive varieties of turnips grown at all the experimental farms, with the length of time they have been under test. Only those sorts are included which have been three years or longer under trial.

Number.	Names of Varieties.	Number of Years under trial.	Average Yield per acre at all the Experimental Farms.	
1	Selected Purple Top	7	31	266
2	Perfection Swede	6	31	202
3	Imperial Swede	3	30	1,948
4	Halewood's Bronze Top	5	30	783
5	Hall's Westbury	5	30	579
6	Hartley's Bronze	7	29	1,700
7	Bangholm Selected	5	29	1,648
8	Webb's Renown	3	29	296
9	East Lothian	7	29	174
10	Shamrock Purple Top	5	28	1,698
11	Carter's Elephant	7	28	1,206
12	Prize Winner	6	28	1,119
13	Skirvings	7	28	1,096
14	Drummond Purple Top	4	28	904
15	Jumbo	7	28	704
16	Prize Purple Top	7	28	610
17	Mammoth Clyde	6	28	549
18	Monarch	3	27	1,608
19	New Arctic	3	27	1,434
20	Sutton's Champion	6	27	1,280
21	Giant King	7	27	820
22	West Norfolk Red Top	3	27	502
23	Champion Purple Top	7	27	130
24	Marquis of Lorne	6	26	1,337

EXPERIMENTS WITH MANGELS.

Twenty-five varieties of mangels were under trial in 1901. These were all sown, side by side, adjoining the turnips; the land was similar in character and its treatment and preparation was the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort, the first on May 8, the second on May 22. They were also pulled on two different dates, the first pulling was on October 14, and the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

MANGELS—TEST OF VARIETIES.

Number.	Name of Variety.	Yield per acre from 1st Sowing 1st Pulling October 14.		Yield per acre from 2nd Sowing 1st Pulling October 14.		Yield per acre from 1st Sowing 2nd Pulling October 28.		Yield per acre from 2nd Sowing 2nd Pulling October 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Champion Yellow Globe	45	1,080	28	430	47	1,370	30	1,710
2	Mammoth Yellow Intermediate	44	1,100	28	1,750	47	380	31	370
3	Yellow Intermediate	44	110	32	350	51	1,620	40	1,510
4	Giant Yellow Intermediate	43	790	30	1,380	39	870	36	270
5	Prize Winner Yellow Globe	42	1,800	34	1,630	55	550	44	440
6	Norbiton Giant	42	1,470	27	450	34	1,300	28	100
7	Half Long Sugar Rosy	42	480	27	450	40	1,180	27	120
8	Giant Yellow Half Long	42	480	34	1,300	41	170	27	780
9	Gate Post	41	830	35	290	38	230	31	40
10	Giant Yellow Globe	41	335	31	370	36	1,260	28	100
11	Half Long Sugar White	39	1,695	30	1,380	48	30	36	930
12	Mammoth Long Red	37	1,570	27	780	41	1,490	28	1,420
13	Warden Orange Globe	37	910	28	760	43	460	32	1,340
14	Golden Fleshed Tankard	36	1,590	24	675	33	330	28	100
15	Leviathan Long Red	36	1,260	30	1,380	46	1,720	42	1,800
16	Prize Mammoth Long Red	36	270	32	20	39	210	31	1,690
17	Lion Yellow Intermediate	35	1,280	31	1,360	41	1,820	36	600
18	Gate Post Yellow	34	1,960	30	60	34	970	24	840
19	Mammoth Oval Shaped	34	640	26	1,460	44	110	29	1,400
20	Selected Mammoth Long Red	34	640	28	1,420	47	710	36	270
21	Ward's Large Oval Shaped	34	310	22	1,540	37	1,240	30	1,710
22	Red Fleshed Tankard	33	1,320	26	510	34	640	26	800
23	Triumph Yellow Globe	33	990	25	490	47	1,040	37	250
24	Canadian Giant	30	225	30	60	38	1,550	32	1,670
25	Yellow Fleshed Tankard	29	1,070	24	1,830	39	210	30	1,710

	Tons.	lbs.
The average from the 1st sowing, 1st pulling was......	38	648
The average from the 2nd sowing, 1st pulling was......	29	405
The average from the 1st sowing, 2nd pulling was......	41	1,978
The average from the 2nd sowing, 2nd pulling was......	32	799

Increase in Crop from Early Sowing and Late Pulling.

The results obtained point to the advantage of early sowing. The average yield of mangels from all the varieties from the first sowing and first pulling has exceeded that of the second sowing by 9 tons 243 pounds per acre, and in the case of the second pulling made fourteen days later, the larger weight from the earlier sowing is well maintained, the difference being 9 tons 1,179 pounds per acre in favour of early sowing.

The figures given also show that the fourteen days of additional time given to the roots to grow between October 14 and 28 resulted in an average increase in weight on the early sown plots of 3 tons 1,330 pounds per acre, while those later sown increased in weight during the same period 3 tons 394 pounds per acre.

In looking through the list of varieties tested it would appear that the different strains of the Yellow Intermediate mangel are the most productive in this part of Canada, and that the strains of the Mammoth Long Red follow these closely. The Globe mangels average next best, while most of the tankard sorts range towards the bottom of the list.

SELECT LIST OF VARIETIES OF MANGELS.

In this list is given the average yield per acre obtained during the past three to six years from the more productive varieties of mangels grown at all the experimental farms, with the length of time they have been under test. Only those sorts are included which have been three years or longer under trial.

Number	Names of Varieties.	Number of Years Under Trial.	Average Yield per acre at all the Expt. Farms.	
1	Yellow Intermediate	6	32	696
2	Giant Yellow Intermediate	6	32	254
3	Gate Post	6	31	160
4	Selected Mammoth Long Red	5	30	575
5	Mammoth Yellow Intermediate	5	29	1,841
6	Lion Yellow Intermediate	3	29	1,123
7	Giant Yellow Half Long	5	29	1,100
8	Giant Yellow Globe	6	29	686
9	Mammoth Long Red	6	29	495
10	Prize Mammoth Long Red	6	28	1,136
11	Norbiton Giant	5	28	4
12	Canadian Giant	6	27	1,861
13	Ward's Large Oval Shaped	5	27	1,020
14	Champion Yellow Globe	6	26	1,349
15	Mammoth Oval Shaped	6	26	444
16	Gate Post Yellow	4	25	1,519
17	Yellow Fleshed Tankard	3	25	841
18	Golden Fleshed Tankard	6	25	540
19	Warden Orange Globe	6	25	459
20	Red Fleshed Tankard	6	24	755

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were under trial in 1901. These were all sown side by side adjoining the turnips and mangels; the land was similar in character and its treatment and preparation was the same. The drills were made up two feet apart, and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were made of each sort, the first on May 8, the second on May 22. They were also pulled on two different dates, the first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

CARROTS—TEST OF VARIETIES.

Number.	Name of Variety.	Yield per acre from 1st Sowing 1st Pulling October 14.		Yield per acre from 2nd Sowing 1st Pulling October 14.		Yield per acre from 1st Sowing 2nd Pulling October 28.		Yield per acre from 2nd Sowing 2nd Pulling October 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Half Long White	43	790	27	1,440	42	1,140	30	390
2	New White Intermediate	42	1,140	31	1,030	38	560	32	1,670
3	Mammoth White Intermediate	40	1,510	36	1,260	44	1,760	32	1,670
4	Giant White Vosges	38	890	30	1,050	42	1,470	32	1,010
5	Iverson's Champion	37	580	29	1,400	35	1,610	39	210
6	Half Long Chantenay	37	250	23	1,190	24	1,500	28	100
7	Ontario Champion	34	1,300	34	310	32	1,010	34	1,630
8	Improved Short White	33	660	32	20	34	1,960	35	1,940
9	Green Top White Orthe	30	1,050	22	1,870	37	910	31	1,690
10	Long Yellow Stump Rooted	28	1,750	23	860	29	1,400	25	1,480
11	White Vosges Large Short	24	1,500	22	1,870	29	1,070	28	1,430
12	Yellow Intermediate	24	1,500	17	980	33	330	22	550
13	Carter's Orange Giant	24	840	21	240	31	370	28	100
14	Early Gem	23	530	21	240	27	780	23	860
15	Guerande or Ox-Heart	22	550	21	570	26	1,790	27	1,970
16	Scarlet Intermediate	21	1,560	20	590	25	820	26	140
17	White Belgian	19	610	23	530	34	1,960	28	1,420
18	Long Orange or Surrey	17	1,970	14	1,370	19	1,270	17	980
19	Long Scarlet Altringham	16	1,330	14	50	20	1,580	17	1,310
20	Scarlet Nantes	14	710	13	730	19	940	15	360

	Tons.	lbs.
The average from the 1st sowing, 1st pulling was......	28	1,651
The average from the 2nd sowing, 1st pulling was......	24	180
The average from the 1st sowing, 2nd pulling was......	31	1,212
The average from the 2nd sowing, 2nd pulling was......	27	1,946

Increase in Crop from Early Sowing and Late Pulling.

The results obtained point to the advantage of early sowing. The average yield of carrots from all the varieties from the first sowing and first pulling has exceeded that from the second sowing by 4 tons 1,471 pounds per acre, and in the case of the second pulling the larger weight from the earlier sown plots is well maintained, the difference being 3 tons 1,266 pounds per acre in favour of early sowing.

The figures given also show that the fourteen days of additional time given to the roots to grow between October 14 and 28 resulted in an average increase in weight of crop on the earlier sown plots of 2 tons 1,261 pounds per acre, while those later sown increased in weight during the same period 3 tons 1,766 pounds per acre.

In scanning the list of varieties and noting their relative position it is evident that the several strains of the White Intermediate Carrot are much the most profitable to grow here. The White Belgian has done fairly well, but it is a very difficult sort to harvest owing to its great length and cylindrical form. The short-rooted varieties of the Half Long Chantenay type have also done well.

SELECT LIST OF VARIETIES OF CARROTS.

In this list is given the average yield per acre obtained during the past three to six years from the more productive varieties of carrots, grown at all the experimental farms, with the length of time they have been under test. Only those sorts are included which have been three years or longer under trial.

Number.	Names of Varieties.	Number of Years under Trial.	Average Yield per Acre at all the Experimental Farms.	
1	New White Intermediate	3	23	1,913
2	Half Long White	6	21	1,250
3	Giant White Vosges	6	21	1,245
4	Improved Short White	6	21	637
5	Ontario Champion	4	21	450
6	Mammoth White Intermediate	6	20	1,705
7	Iverson's Champion	6	20	601
8	Green Top White Orthe	5	19	1,601
9	White Belgian	6	18	897
10	White Vosges Large Short	3	18	104
11	Yellow Intermediate	6	17	1,335
12	Early Gem	6	17	1,295
13	Half Long Chantenay	6	17	923
14	Guerande or Ox-Heart	6	17	523
15	Carter's Orange Giant	6	15	208
16	Long Orange or Surrey	6	13	1,703
17	Scarlet Intermediate	6	13	320
18	Long Scarlet Altringham	6	12	506
19	Scarlet Nantes	3	11	1,443

EXPERIMENTS WITH SUGAR BEETS.

Seven varieties of sugar beets were under trial in 1901. These were all sown side by side adjoining the carrots; the land was similar in character and its treatment and preparation was the same. The drills were made up two feet apart and rolled with a heavy land roller to make a firm bed before the seed was sown. Two sowings were

made of each sort, the first on May 8, the second on May 22. They were also pulled on two different dates. The first pulling was on October 14, the second on October 28. The yield per acre has been calculated in each case from the weight of roots gathered from one row 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Number.	Name of Variety	Yield per Acre from 1st Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 2nd Sowing. — 1st Pulling Oct. 14.		Yield per Acre from 1st Sowing. — 2nd Pulling Oct. 28.		Yield per Acre from 2nd Sowing. — 2nd Pulling Oct. 28.	
		Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.
1	Red Top Sugar	34	640	25	1,150	32	20	26	470
2	Royal Giant	33	660	29	1,070	33	330	26	140
3	Danish Improved	33	330	25	490	26	140	22	880
4	Danish Red Top	31	1,360	25	1,480	29	1,400	22	880
5	Improved Imperial	28	430	26	1,130	26	1,790	26	1,130
6	Wanzleben	25	160	21	1,890	25	490	18	1,950
7	Vilmorin's Improved	22	1,210	18	300	20	590	15	30

	Tons.	lbs.
The average crop from the 1st sowing, 1st pulling was..	29	1,541
The average crop from the 2nd sowing, 1st pulling was..	24	1,359
The average crop from the 1st sowing, 2nd pulling was..	27	1,251
The average crop from the 2nd sowing, 2nd pulling was..	22	1,069

Results of Early Sowing and Late Pulling.

The figures given above point to the advantage of early sowing. The average yield of sugar beets from all the varieties from the first sowing and first pulling has exceeded that from the second sowing by 5 tons 182 pounds per acre, and in the case of the second pulling made fourteen days later, precisely the same result is reached, the first sowing exceeding the second by 5 tons 182 pounds per acre.

In this case, however, the figures show no advantage from delay in pulling. On the contrary the yield from the second pulling, both sowings have given at the rate of 2 tons 290 pounds per acre less in each case than was had from the first pulling.

SELECT LIST OF VARIETIES OF SUGAR BEETS.

In this list is given the average yield per acre obtained during the past four and five years from the more productive varieties of sugar beets, grown at all the experimental farms, with the length of time they have been under test. Only those sorts are included which have been three years or longer under trial.

Names of Varieties.	Number of Years under Trial.	Average Yield per Acre at all the Experimental Farms.	
		Tons.	Lbs.
Danish Red Top	4	26	246
Red Top Sugar	5	23	172
Danish Improved	5	22	1,091
Improved Imperial	5	22	792
Wanzleben	5	21	553
Vilmorin's Improved	5	19	118

FIELD PLOTS OF POTATOES.

The following field plots of potatoes were included in the area devoted to experimental purposes. The land on which these potatoes were planted was similar throughout, and the preparation and treatment were the same for all. The soil was a sandy loam, more or less mixed with clay. The previous crop was experimental plots of wheat. After the wheat crop was cut the land was gang-ploughed shallow to start into growth any shed grain or weed seeds lying on the surface; later in the autumn it was again ploughed seven to eight inches deep. During the winter of 1900 and 1901 it received a dressing of about 12 tons of fresh barn-yard manure per acre, which was placed during the winter on the frozen ground in small piles of about a third of a cartload each to prevent fermentation. This was spread in the spring, ploughed under about six inches deep, and harrowed with the smoothing harrow, then made into drills two and a half feet apart and six inches deep for planting. The sets were put from 12 to 15 inches apart. They were all planted May 18, and dug October 4.

FIELD PLOTS OF POTATOES, EACH ABOUT ¼ ACRE.

Number.	Name of Variety.	Yield per Acre.	
		Bush.	Lbs.
1	Early Harvest	313	30
2	Early Sunrise	303	45
3	Wonder of the World	289	8
4	Early Andes	280	48
5	Vigorosa	270	
6	Rochester Rose	262	30
7	Everett	261	
8	Carman No. 1	246	9
9	Bovee	228	36
10	Honeoye Rose	196	30

Plots 8, 9 and 10 were partly in low land, which accounts for the smaller yield.

The results of the tests of potatoes grown in experimental plots will be found in the report of the Horticulturist.

SELECT LIST OF VARIETIES OF POTATOES.

In this list is given the average yield per acre obtained during the past three to seven years from the most productive varieties grown at all the experimental farms, with the length of time they have been under test. Only those are included which have been three years or longer under trial. On this account many of the newest sorts do not appear in this list. During the past seven years a large number of varieties have been tested, and quite a number of different sorts have failed to reach that standard of productiveness required if their cultivation is to be continued. The standard for potatoes is fixed in the same way as that for oats. This will be found explained under 'Select list of oats.'

The following 29 varieties have thus been dropped from the list during the past two years. Algoma No. 1, Columbus, Crown Jewel, Charles Downing, Early Gem, Fillbasket, Freeman, Good News, Honeoye Rose, Hopeful, Harbinger, Ideal, Lightning Express, London, King of the Roses, McKenzie, Monroe County, Orphans, Pride of the Table, Peerless Junior, Queen of the Valley, Russell's Seedling, Record, Satisfaction, Seedling No. 214, Stourbridge Glory, Table King, Victor Rose, World's Fair.

Number.	Names of Varieties.	Number of Years under Trial.	Average Yield per Acre at all the Experimental Farms.	
			Bush.	Lbs.
1	Uncle Sam	4	403	35
2	Seedling No. 230	6	391	43
3	Everett	7	390	41
4	Country Gentleman	3	387	58
5	Seedling No. 7	5	386	26
6	Irish Daisy	7	384	56
7	Bovee	4	384	45
8	American Wonder	7	384	6
9	American Giant	7	383	17
10	Late Puritan	7	369	14
11	Carman No. 1	7	367	22
12	Carman No. 3	5	366	40
13	Rose No. 9	5	366	33
14	Seattle	6	364	43
15	Empire State	7	363	11
16	Burnaby Seedling	6	361	30
17	Quaker City	5	361	26
18	Penn. Manor	3	361	10
19	State of Maine	7	359	34
20	General Gordon	6	358	33
21	Holborn Abundance	7	358	28
22	Clay Rose	7	357	34
23	Northern Spy	7	356	54
24	Green Mountain	6	356	46
25	Vanier	7	355	1
26	New Variety No. 1	6	354	54
27	Cambridge Russet	4	354	5
28	Maule's Thoroughbred	4	351	3
29	Dreer's Standard	7	350	56
30	Dakota Red	7	349	14
31	Reeves' Rose	5	348	51
32	I. X. L.	7	345	40
33	Hale's Champion	6	344	36
34	Vick's Extra Early	6	344	25
35	Money Maker	7	344	12
36	Troy Seedling	7	343	38
37	Delaware	7	342	55
38	Lee's Favourite	6	342	47
39	Rochester Rose	7	341	30
40	Lizzie's Pride	7	340	56
41	Brown's Rot Proof	6	339	41
42	Polaris	7	336	..
43	Irish Cobbler	5	335	11
44	Sir Walter Raleigh	4	334	33
45	Bill Nye	5	333	49
46	Early Norther	7	332	42
47	Early Puritan	7	332	8
48	Great Divide	7	332	1
49	Early White Prize	7	330	24
50	Rural Blush	7	329	53
51	Reading Giant	6	327	52
52	Pride of the Market	7	326	17
53	Chicago Market	6	326	2
54	Pearce's Prize Winner	6	325	28
55	White Beauty	7	324	15
56	Brownell's Winner	7	323	25
57	New Queen	7	322	28
58	Early Harvest	7	319	2
59	Early Sunrise	7	317	30
60	Flemish Beauty	6	316	51
61	Maggie Murphy	7	316	1
62	Houlton Rose	5	315	28
63	Sharpe's Seedling	7	309	27
64	Earliest of All	7	307	39
65	Rural No. 2	6	306	33
66	Thorburn	7	305	7
67	Beauty of Hebron	7	304	36

Number.	Names of Varieties.	Number of Years under Trial.	Average Yield per Acre at all the Experimental Farms.	
			Bush.	Lbs.
68	Daisy	7	303	54
69	Early Rose	7	302	8
70	Prize Taker	7	299	41
71	Early Market	3	298	19
72	Early Six Weeks	7	294	15
73	Ohio Junior	5	287	45
74	Burpee's Extra Early	7	282	59
75	Pearce's Extra Early	7	282	1
76	Early Ohio	7	273	51

EXPERIMENTS WITH SOJA BEANS.

Three plots of one-fortieth acre each were sown in rows at different distances apart, viz.: 21, 28 and 35 inches to gain information as to the best distance for sowing to secure the heaviest crops. The soil was a light sandy loam which received a dressing of barn-yard manure during the winter of 1899 and 1900 of about 12 tons per acre. The previous crop was potatoes. After the potatoes were dug, the land was ploughed late in the autmn to the depth of about seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow. The beans were sown with a seed drill on May 6, and cut on September 21.

Plot 1. Sown in rows 21 inches apart; growth strong and even, leafy; average height 40 to 45 inches. The pods were well formed, but the beans were soft when the crop was cut. Total yield of green crop 14 tons 800 pounds per acre. Yield of beans, 14 bushels 40 pounds per acre.

Plot 2. Sown in rows 28 inches apart; growth strong and even, very leafy; average height 40 to 45 inches. The pods were well formed, the beans were full grown, and beginning to harden at time of cutting. Total yield of green crop, 16 tons 400 pounds per acre. Yield of beans, 16 bushels per acre.

Plot 3. Sown in rows 35 inches apart; growth very strong and even, leafy; stems hard and woody; average height 44 to 48 inches. The plants were better podded than those in plots 1 or 2, and the beans were harder when cut, but the plant was less valuable for fodder. Total yield of green crop, 15 tons 720 pounds per acre. Yield of beans, 10 bushels per acre.

EXPERIMENTS WITH HORSE BEANS.

Three plots of one-fortieth acre each were sown in rows 21, 28 and 35 inches apart, to gain information as to the best distance for sowing to secure the heaviest crop. The land was adjoining that used for soja beans, was similar in quality and received the same treatment. The previous crop was potatoes. The beans were sown with the seed drill; all the plots were sown on May 6, and cut on September 21.

Plot 1. Sown in rows 21 inches apart; growth strong, moderately well podded; height 47 to 50 inches, plot all standing. The beans were nearly ripe when cut. Total yield, 8 tons 1,280 pounds per acre. Yield of beans, 22 bushels 40 pounds per acre.

Plot 2. Sown in rows 28 inches apart; growth strong and well podded; height 49 to 53 inches. Plot all standing, stalks considerably stiffer than in plot No. 1. The beans were nearly ripe when cut. Total yield, 9 tons 1,600 pounds per acre. Yield of beans, 26 bushels 40 pounds per acre.

Plot 3. Sown in rows 35 inches apart; growth strong, well podded; height 49 to 53 inches. Plot all standing, stalks stiff. The beans were nearly ripe when cut. Total yield, 8 tons 400 pounds per acre. Yield of beans, 20 bushels 6 pounds per acre.

EXPERIMENTS WITH MILLETS.

Nine varieties of millet were sown on plots of one-fortieth acre each in drills seven inches apart. The soil was a light sandy loam. The previous crop was potatoes. The land receiving a dressing of barn-yard manure during the winter of 1899 and 1900 of about 12 tons per acre. After the potatoes were dug the land was ploughed to the depth of seven or eight inches, and left in that condition till the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow before sowing. The seed was sown with a Planet Junior seed drill, and all the varieties were sown on May 6. These were all cut when the seed was in the doughy stage. The two varieties under numbers were received for trial from the United States Department of Agriculture, Washington.

MILLETS—TEST OF VARIETIES.

Number.	Name of Variety.	Date Cut.	Length of Straw.	Character of Growth.	Weight per Acre, Green.		Weight per Acre, Dry.	
			Inches.		Tons.	Lbs.	Tons.	Lbs.
1	Cat-tail	Sept. 23.	60—65	Strong.	17	1040	8	1280
2	Pearl	Aug. 27.	32—38	"	16	1920	8	1280
3	White Round Extra French	July 27.	63—65	"	11	1040	5	1520
4	Moha Hungarian	" 27.	48—50	"	10	1760	5	240
5	Japanese	Aug. 27.	53—55	"	9	560	4	640
6	German or Golden	" 27.	48—50	"	8	1920	4	1920
7	Italian or Indian	" 27.	43—46	Medium.	7	1680	3	1360
8	No. 5647 (Dept. Agr., Wash., U.S.A.)	" 12.	34—36	"	6	800	3	720
9	No. 5648 (" " ")	" 12.	34—36	"	6	480	3	400

EXPERIMENTS WITH MIXED ROOTS AND WITH MIXED ROOTS AND VEGETABLES.

Four plots were sown with mixtures of field roots, and one with carrots, cabbages and tomatoes to see how far a farmer could thus supply himself with such material for his own use at very little cost and labour.

Four rows were sown in each case about 100 feet long and two feet apart, the seed was sown about the usual thickness and the plants subsequently thinned. About equal parts by weight of seed was used in all the plots, excepting No. 5, where it was used in about equal proportions by measure. Any undue proportion of young plants of any sort can be regulated when the thinning is done. They were all sown May 8, and the roots were pulled October 30. The vegetables were gathered about the middle of September.

Mixed Roots and Roots and Vegetables.			Yield per Acre.	
			Tons.	Lbs.
Plot 1—Mangels, carrots and turnips			40	1,840
" 2—Mangels and turnips			39	1,200
" 3—Mangels and carrots			39	870
" 4—Carrots and turnips			38	230
Carrots, Cabbages and Tomatoes.	Tons.	Lbs.		
5 Yield per acre of Cabbage	18	960		
" " Carrots	7	520		
" " Tomatoes	8	1,820	34	1,300

Although sown out of doors and having no advantage in the way of hot-bed cultivation, the tomatoes grew well and ripened a large crop, the cabbage also which was an early variety formed fine heads. All cultivation was by horse cultivator until the plants got too large to admit of this. The expense, both for seed and labour was very trifling. The yield per acre has been calculated in each case from the weight of one row 66 feet long.

INFLUENCE OF PREVIOUS CROPS ON GROWING GRAIN.

In the annual report for 1900, some experiments were reported on in the growing of oats after other crops to gain information regarding the influence of previous crops on subsequent growth, and how long this influence is apparent. Six plots were then referred to where Sensation oats were grown after flax, grain, horse beans, soja beans, Indian corn and millet, and particulars regarding the oat crop given. This year the test has included four plots only, the Indian corn and millet plots having been omitted. Barley was sown instead of oats, the variety chosen being the Mensury, which was sown at the rate of 1¾ bushels per acre. The soil in this instance was a sandy loam which had received no manure since 1897, when an application was made of about 12 tons per acre. The land was ploughed late in the autumn of 1900 to a depth of 7 or 8 inches, and in the spring of 1901 it was cultivated twice with the two-horse cultivator, and well harrowed before sowing.

Sown in 1899.	In 1900.				In 1901.			
	Sensation oats Yield per Acre.		Length of Straw.	Length of Head.	Mensury barley Yield per Acre.		Length of Straw.	Length of Head.
	Bush.	Lbs.	Inches.	Inches.	Bush.	Lbs.	Inches.	Inches.
Plot 1—Flax	49	14	40—45	8 — 9½	35	—	37—39	3—3½
" 2—Grain	58	28	43—48	8½— 9½	39	8	36—38	3—3½
" 3—Horse beans	69	14	46—50	9 —10	40	—	38—40	3—4
" 4—Soja beans	49	14	40—45	8½— 9½	31	32	33—35	3—3½

EFFECTS OF THE PLOUGHING UNDER OF GREEN CLOVER AS A FERTILIZER FOR OATS.

In the spring of 1900, six plots of one-eightieth of an acre each were sown with grain. Two of these plots were sown with Preston wheat, two with Mensury barley,

and two with Banner oats. One plot in each case had common red clover sown with the grain at the rate of 12 pounds per acre, the other had no clover. The soil was a light sandy loam of fairly good quality, which had received no manure or other fertilizer since 1897, when it had an application of about 12 tons per acre.

After the grain was harvested in 1900, the clover on the alternate plots made good growth, and when the time arrived for ploughing it under it had made a good mat of foliage. This was turned under about the middle of October, and in the spring of 1901 it was cultivated twice with the two-horse cultivator, and harrowed before sowing. The Banner oats were sown on May 4, and cut August 5.

Variety.	Length of Straw.	Length of Head.	Yield of Oats per acre.	Weight of Straw per acre.
Banner oats sown after,	Inches.	Inches.	Bus. Lbs	Lbs.
Wheat Preston, 1900, no clover	42—44	8—9	47 2	2,480
Wheat Preston, 1900, with clover	47—49	8—9½	49 14	3,440
Barley Mensury, 1900, no clover	40—42	8—9	37 22	1,920
Barley Mensury, 1900, with clover	47—49	8—9½	42 12	2,640
Oats Banner, 1900, no clover	37—39	8—9	35 10	2,240
Oats Banner, 1900, with clover	46—48	8—9½	40 --	3,040

The average gain in those plots where clover was grown was, in grain 3 bushels 31 pounds per acre, and in straw 827 pounds per acre, an increase of nearly 10 per cent in the grain, and over 35 per cent in the straw.

EFFECTS OF THE PLOUGHING UNDER OF GREEN CLOVER AS A FERTILIZER FOR INDIAN CORN.

In the spring of 1900, six plots of one-eightieth of an acre each were sown with grain. Two were sown with Preston wheat, two with Mensury barley, and two with Banner oats. One plot in each case had common red clover sown with the grain at the rate of 12 pounds per acre, the other had no clover. These plots were adjoining those of a similar test of oats, and the soil was of the same character and had received the same preparatory treatment. After the grain was harvested in 1900, the clover was allowed to grow until the following season, and was ploughed under about the middle of May, by which time it had made a very heavy growth. The variety of corn chosen for these tests was the Selected Leaming, which was sown on May 23, in rows 3 feet apart, and cut September 18. The results are given in the appended table.

Variety.	Height.	Leafiness.	Condition when cut.	Weight of green fodder per Acre.
Selected Leaming grown after,	Inches.			Tons. Lbs.
Wheat Preston, no clover	85— 90	Medium..	Late milk.	19 1,280
Wheat Preston, with clover	92—106	Very leafy	"	27 1,760
Barley Mensury, no clover	85— 90	Medium..	"	15 1,600
Barley Mensury, with clover	92—106	Very leafy	"	27 880
Oats Banner, no clover	85— 90	Medium..	"	20 160
Oats Banner, with clover	92—106	Very leafy	"	25 1,600

The average gain in green fodder on the plots where clover was grown, was 8 tons 1,066 pounds per acre, an increase of over 40 per cent.

EFFECTS OF THE PLOUGHING UNDER OF GREEN CLOVER AS A FERTILIZER FOR POTATOES.

In the spring of 1900, six plots of one-eightieth of an acre each were sown with grain. Two were sown with Preston wheat, two with Mensury barley, and two with Banner oats. One plot in each case had common red clover sown with the grain at the rate of 12 pounds per acre, the other had no clover. These plots were adjoining those of a similar test with oats and Indian corn, and the soil was of the same character and had received the same preparation. After the grain was harvested in 1900, the clover was allowed to grow until the following season, and was ploughed under about the middle of May, by which time it had made a very heavy growth. The variety of potato chosen for this test was the Everett, which was planted on May 23, in rows 3 feet apart, and dug October 4. The results were as follows:—

Variety Everett.	Yield per acre.	
Everett potato planted after,	Bush.	Lbs.
Preston wheat, no clover	396	40
Preston wheat, with clover	440	
Mensury barley, no clover	396	
Mensury barley, with clover	420	
Banner oats, no clover	381	20
Banner oats, with clover	411	20

The average gain of potatoes on the plots where the clover was grown, was 32 bushels 27 pounds per acre, being an increase of over 8 per cent.

EFFECTS OF FERTILIZERS ON SPRING WHEAT, OATS, CLOVER AND BROME GRASS.

During the season of 1900, two series consisting in each case of sixteen one-eightieth acre plots were laid out, twelve of which in each set were treated with different fertilizers, and the remaining four left as check plots which received no fertilizers.

One set of these plots was sown with spring wheat of the variety known as Preston, another with a variety of oats known as Improved Ligowo. Two other series each consisting of nine plots were planned, one to be used for experiments with common red clover, and the other for the Awnless Brome grass *Bromus inermis.*

The object in view in these tests is to gain information as to the effects on crops sown on land in a fair average condition of fertility, of superphosphate of lime and Thomas' phosphate, both used singly, also of superphosphate of lime with kainit and with kainit and nitrate of soda, and of Thomas phosphate with kainit, and with kainit and nitrate of soda. In the series of plots planned for wheat and oats, provision was also made for testing the relative value of barn-yard manure fresh and rotted, fresh slaked lime and nitrate of soda alone in the proportions of 100 and 200 pounds per acre with a check plot between them. In 1900 all these were reported on, but this year through a misunderstanding the last five plots in each of these series were not sown, hence returns can only be given for nine plots in each case.

The land chosen for this test was in a fairly good condition of tilth. The soil was a sandy loam which has been under cultivation since 1887, and has been cropped each year since, with a suitable rotation of crops and has received a dressing of barn-yard manure about once in four years. The last application of manure was in 1897 when it received about 12 tons per acre. The land was cropped in 1899 with experimental grain in plots mostly barley.

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It is proposed to grow the same crops on this land for a series of years, using the same fertilizer in the same quantities every second year. In this way it is hoped that some further information may be gained as to the effect of these different fertilizers when used singly and in combination on the important crops named. As this land was at the start in a fair average condition as to fertility, it may be regarded as representing in a general way average sandy loams on farms properly worked. The fertilizers were applied in the spring of 1900, but none were used in 1901. The spring wheat and oats were both sown on May 4, and both were ripe on August 5.

RESULTS OF THE APPLICATION OF FERTILIZERS TO SPRING WHEAT.

No. of Plot.	Name of Variety, Preston.	Season of 1900.		Season of 1901.		
		Yield of grain per acre.		Yield of grain per acre.		Weight of straw per acre.
	Fertilizers used.	Bush.	Lbs.	Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	25	20	26	40	2,800
2	Thomas' phosphate, 400 lbs. per acre	25	20	30	40	2,240
3	Thomas' phosphate, 800 lbs. per acre	25	20	28	—	2,480
4	Check	26	40	26	40	2,400
5	Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre	26	40	24	—	2,000
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	24	40	24	—	2,000
7	Check	25	20	27	20	1,960
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	26	—	26	40	2,240
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	26	—	24	40	2,120

RESULTS OF THE APPLICATION OF FERTILIZERS TO OATS.

No. of Plot.	Name of Variety, Improved Ligowo.	Season of 1900.		Season of 1901		
		Yield of grain per acre.		Yield of grain per acre.		Weight of straw per acre.
	Fertilizers used.	Bush.	Lbs.	Bush.	Lbs.	Lbs.
1	Superphosphate, 400 lbs. per acre	70	20	47	20	3000
2	Thomas' phosphate, 400 lbs. per acre	72	22	51	26	3280
3	Thomas' phosphate, 800 lbs. per acre	72	22	45	30	2920
4	Check	75	10	42	12	2400
5	Thomas's phosphate, 400 lbs. kainit, 200 lbs. per acre	70	20	40	—	2240
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	73	18	40	—	2560
7	Check	73	18	42	12	2800
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	70	20	49	14	3200
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	68	8	51	26	3680

In both these series of tests the two check plots to which no fertilizers have been applied have given crops of grain averaging as large as those on which fertilizers have been used. The crops of straw, however, average heavier on the plots which were fertilized. This would seem to indicate that the land still contains as much available plant food as the crops could utilize for grain production under the conditions prevailing during these two seasons. With the partial exhaustion which successive crops will produce, the relative usefulness of the several fertilizers will probably be more clearly shown.

On the plots used for the tests of common red clover the seed was sown in the spring of 1900, in the proportion of 12 pounds per acre, and on the plots for brome grass the seed was also sown in the spring of 1900, in the proportion of 20 pounds per acre. The growth, both of clover and brome grass, was strong on all these plots.

RESULTS OF THE APPLICATION OF FERTILIZERS TO CLOVER.

No. of plot	Fertilizers used.	Length of clover. 1st cutting	Length of clover. 2nd cutti'g	Yield per acre green 1st cutting.		Yield per acre cured 1st cutting.		Yield per acre green 2nd cutting.		Yield per acre cured 2nd cutting.	
		Inches.	Inches.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs	Tons.	Lbs
1	Superphosphate, 400 lbs. per acre	34—36	18—20	14		3	1,080	4	1,520	1	640
2	Thomas' phosphate, 400 lbs. per acre	32—34	17—19	14	1,440	3	1,920	7	400	1	1,480
3	Thomas' phosphate, 800 lbs. per acre	36—40	17—19	13	1,680	3	1,440	7		1	1,280
4	Check	32—34	19—21	13	720	3	960	6	240	1	1,200
5	Thomas' phosphate, 400 lbs. kainit, 200 lbs per acre	32—34	19—21	13	1,840	3	1,040	5	1,920	1	1,200
6	Superphosphate, 400 lbs. kainit, 200 lbs. per acre	36—38	19—21	13	1,280	3	1,040	3	1,040	1	240
7	Check	32—34	19—21	12	1,600	3	1,200	4	1,840	1	1,200
8	Thomas' phosphate, 400 lbs. kainit, 200 lbs. nitrate soda 100 lbs. per acre	38—40	16—18	13	160	3	1,120	2	1,440		1,600
9	Superphosphate, 400 lbs. kainit, 200 lbs. nitrate soda, 100 lbs. per acre	34—36	18—20	12	960	3	1,040	1	1,840		1,120

RESULTS OF THE APPLICATION OF FERTILIZERS TO AWNLESS BROME GRASS.

(Bromus inermis.)

No. of plot	Awnless Brome Grass (Bromus inermis).	Length of Brome Grass.	Yield per acre green.		Yield per acre cured.	
	Fertilizers used.	Inches.	Tons.	Lbs.	Tons.	Lbs.
1	Superphosphate, 400 lbs. per acre	48—52	7		4	640
2	Thomas' phosphate, 400 lbs. per acre	48—50	6	1,840	3	1,600
3	Thomas' phosphate, 800 lbs. per acre	46—48	5	480	2	1.600
4	Check	44—46	4	800	1	1,920
5	Thomas' phosphate, 400 lbs. kainit, 200 lbs. per acre	46—48	5	240	2	800
6	Superphosphate, 400 lbs., kainit, 200 lbs. per acre	46—48	4	1,120	2	80
7	Check	47—50	4	1,920	2	320
8	Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	47—50	7	560	3	800
9	Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre	42—44	5	1,440	2	520

SPECIAL EXPERIMENTS WITH FERTILIZERS.

In the annual report of the Experimental Farms for 1893, details were given on pages 8 to 24 of the results of a series of tests which were carried on during the previous five or six years with the object of gaining information regarding the effects which follow the application of certain fertilizers and combination of fertilizers on the more important farm crops. The particulars there given covered the results of six years' experience with crops of wheat and Indian corn and five years' experience with

crops of oats, barley, turnips and mangels. The results of similar tests conducted for three years with carrots and one year with sugar beets were also given.

These experiments have been continued; and as explanatory regarding the preparations made and the general plan together with the way in which they have been carried on, the following paragraphs are quoted from the report of 1893:—

'A piece of sandy loam more or less mixed with clay, which was originally covered with heavy timber, chiefly white pine, was chosen for these tests. The timber was cut many years ago, and among the stumps still remaining when the land was purchased, there had sprung up a thick second growth of trees, chiefly poplar, birch and maple, few of which exceeded 6 inches in diameter at the base. Early in 1887, this land was cleared by rooting up the young trees and stumps and burning them in piles, on the ground from which they were taken, the ashes being afterwards distributed over the soil as evenly as possible, and the land ploughed and thoroughly harrowed. Later in the season it was again ploughed and harrowed, and most of it got into fair condition for cropping.

'The plots laid out for the experimental work with fertilizers were one-tenth of an acre each, 21 of which were devoted to experiments with wheat, 21 to barley, 21 to oats, 21 to Indian corn or maize, and 21 to experiments with turnips and mangels. It was not practicable to undertake work on all the plots the first season. The tests were begun in 1888 with 20 plots of wheat and 16 of Indian corn, and in 1889 all the series were completed excepting six plots of roots, Nos. 16 to 21 inclusive, which were available for the work in 1890.' In all cases the plots in each series have been sown on the same day.

'In 1890 it was found that all the grain plots had become so weedy that the growth of the crops was much interfered with, and with the view of cleaning the land, one-half of each of the wheat and oat plots was sown with carrots in 1891, and one-half of each of the barley plots with sugar beets. In 1892 the other half of each plot in each of these series was sown with carrots. In 1893 it was thought desirable to continue this cleaning process, and carrots were again sown on the half of the wheat and oat plots occupied with this crop in 1891, and also the half of the barley plots cropped with sugar beets that year.' In 1894, 1895, 1896, 1897 and 1898 the one-half of the oat plots were sown again with carrots and the half of the plots devoted to wheat and barley were planted with potatoes.

TREATMENT OF SOIL.

'The treatment of the soil on all the grain plots has been to gang-plough soon after harvest, and after the shed grain and weeds have well started to plough again later, about 7 inches deep. In spring the plots have been gang-ploughed once before applying the fertilizers, which are then scattered over the surface and harrowed with the smoothing harrow before sowing. On those plots where barn-yard manure has been used, the manure has been lightly ploughed under as soon as possible after it has been spread on the land and just before sowing. Wherever barn-yard manure is spoken of, it is understood to be a mixture of horse and cow manure in about equal proportions.'

A summary of these permanent fertilizer plots is given each year, taking the average yield of the whole previous period, adding the results of the current year, and then giving the average yield for the full time.

OBJECTS IN VIEW IN CONDUCTING THESE EXPERIMENTS.

It should be distinctly understood that in establishing and conducting this series of experiments, the object in view has been to gain as much information as possible as to the actual effects of certain fertilizers and combinations of fertilizers on particular crops. These experiments were never intended to serve as model test plots such

as farmers could copy to advantage in their general practice. On the contrary, to gain the information desired, it has been found necessary to use some fertilizers in extravagant quantities, and in other instances to more or less exhaust the soil by a succession of crops of the same sort, practices which in ordinary farming would be detrimental. Nevertheless, much useful information has been acquired, some of a positive and some of a negative character, by this long-conducted and extensive series of tests. The information now gained from year to year throws light in many ways on the action of fertilizers and is increasingly useful.

VALUABLE INFORMATION GAINED.

As results of these trials, it has been shown that barn-yard manure can be most economically used in the fresh or unrotted condition; that fresh manure is equal, ton for ton, in crop-producing power to rotted manure, which, other experiments have shown, loses during the process of rotting about 60 per cent of its weight. In view of the vast importance of making the best possible use of barn-yard manure, it is difficult to estimate the value of this one item of information.

At the time when these experiments were planned, the opinion was very generally held that untreated mineral phosphate, if very finely ground, was a valuable fertilizer, which gradually gave up its phosphoric acid for the promotion of plant growth. Ten years' experience has shown that mineral phosphate, untreated, is of no value as a fertilizer.

The use of sulphate of iron, which at the time these tests were begun, was highly recommended by an authority at that time eminent, as a reliable means of producing increased crops, has also been proven to be almost useless for this purpose.

Common salt, which has long had a reputation with many farmers for its value as a fertilizer for barley, while others disbelieved in its efficacy, has been shown to be a most valuable agent for producing an increased crop of that grain, while it is of much less use when applied to crops of spring wheat or oats. Land plaster or gypsum has also proven to be of some value as a fertilizer for barley, while of very little service for wheat or oats. Some light has also been thrown on the relative usefulness of single and combined fertilizers.

CHANGES MADE IN THE EXPERIMENTS.

After ten years' experience had demonstrated that finely-ground, untreated mineral phosphate was of no value as a fertilizer, its use was discontinued in 1898. Prior to this it had been used in each set of plots in Nos. 4, 5, 6, 7 and in No. 8 also, in all the different series of plots, excepting roots. In 1898 and 1899, similar weights of the Thomas' phosphate was used in place of the mineral phosphate, excepting in plot 6 in each series. In this plot the Thomas' phosphate was used in 1898 only.

After constant cropping for ten or eleven years, it was found that the soil on those plots to which no barn-yard manure had been applied was much depleted of humus, and hence its power of holding moisture had been lessened and the conditions for plant growth, apart from the question of plant food, had on this account become less favourable. In 1899 the experiments were modified and an effort made to restore some proportion of the humus and at the same time gain further information as to the value of clover as a collector of plant food. In the spring of that year ten pounds of red clover seed per acre was sown with the grain on all the plots of wheat, barley and oats. The clover seed germinated well, and after the grain was cut the young clover plants made rapid growth, and by the middle of October there was a thick mat of foliage varying in height and density on the different plots, which was ploughed under. The growing of carrots and potatoes on one half of the cereal plots has been discon-

tinued since 1898, and each plot of the wheat, barley and oats has occupied the full tenth of an acre.

In 1900 and 1901 clover was again sown on all the grain plots, which produced a good growth during the season and was ploughed under in October.

APPLICATION OF FERTILIZERS DISCONTINUED.

Another direction in which information was sought was in reference to the length of time which a liberal application of barn-yard manure would continue to affect subsequent crops, and in 1899 on plots 1, 2 and 6 the barn-yard manure, which had been used for ten or eleven years in succession, was discontinued. The phosphate fertilizer was also omitted on plot 6 in each series.

In 1900 all the fertilizers on all the plots were discontinued, and it is proposed to continue to grow the same crops on all these plots from year to year without fertilizers for some years, sowing clover with the grain each season. In this way it is expected that much information will be gained as to the value of clover as a collector of plant food, and also as to the unexhausted values of the different fertilizers which have been used on these plots since the experiments were begun.

SPECIAL TREATMENT OF PLOTS OF INDIAN CORN AND ROOTS.

As it was not practicable to sow clover to advantage on the Indian corn and root plots, the sowing of these latter crops was discontinued in the spring of 1900 and clover sown in their place in the proportion of 12 pounds per acre, and no fertilizers were applied. The clover on these plots made strong growth, so strong as to necessitate twice cutting during the season, the cut clover being left on the ground in each case to decay and add to the fertility of the soil, and was left over for further growth in the spring of 1901, and ploughed under for the roots about May 10, and for corn about the middle of that month. Then roots and Indian corn were again sown. This course will be continued for some years, growing Indian corn and roots every second year, and common red clover the alternate season. No fertilizers were applied in 1900 or 1901, and it is proposed to discontinue their use entirely for some years, so that the effect on these crops of the ploughing under of clover every second year may be carefully studied under the varying conditions presented by these more or less exhausted plots.

WHEAT PLOTS.

The seed sown on each of these plots from the beginning has been in the proportion of 1½ bushels per acre, excepting in 1894; and the varieties used were as follows:— In 1888-89-90 and 1891, White Russian, and in 1892-3, Campbell's White Chaff. In 1894, the Rio Grande wheat was used, when, owing to lack of germinating power in the seed, a larger quantity was required. In 1895, 1896, 1897, 1898, 1899, 1900 and 1901 Red Fife wheat was used in the usual quantity of 1½ bushels per acre. In 1901, the Red Fife was sown April 30, came up May 8, and was ripe from August 10 to 12.

The season of 1901 has not been specially favourable for the growing of spring wheat at Ottawa, and the fact that all the plots have increased in yield notwithstanding that the fertilizers have been all discontinued for the past two years seems to show that the ploughing under of the green clover is having a beneficial effect. This influence is very evident on the check plots which have been unmanured from the beginning where the increase both in grain and straw is remarkable.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{10}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Thirteen Years.			14th Season, 1901, Variety Red Fife.			Average Yield for Fourteen Years.		
		Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.
		Per acre.		Per acre	Per acre.		Per acre	Per acre.		Per acre
		Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.	21	$26\frac{7}{13}$	3,965	26	50	5,370	21	$49\frac{9}{14}$	4,065
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.	22	$4\frac{4}{13}$	4,007	28	45	5,295	22	$14\frac{13}{14}$	4,099
3	Unmanured from the beginning.	10	$33\frac{11}{13}$	1,873	17	20	2,370	11	$2\frac{12}{14}$	1,908
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' Phosphate was used. No fertilizers have been applied since then.	10	45	2,027	18	15	2,785	11	$17\frac{2}{14}$	2,081
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	12	$33\frac{11}{13}$	2,855	13	15	2,825	12	$36\frac{11}{14}$	2,853
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	18	$46\frac{10}{13}$	3,300	23	20	4,575	19	$6\frac{4}{14}$	3,371
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	12	$46\frac{8}{13}$	2,510	16	50	3,885	13	4	2,608
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	10	$49\frac{6}{13}$	2,078	14	35	3,145	11	$5\frac{8}{14}$	2,154
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	11	$57\frac{12}{13}$	1,890	15	50	2,420	11	$55\frac{12}{14}$	1,928
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	12	$53\frac{6}{13}$	3,029	14	40	2,745	13	$1\frac{1}{14}$	3,009

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{10}$TH ACRE EACH—*Continued.*

No of Plot.	Fertilizers applied each Year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Thirteen Years. Yield of Grain. Per acre.		Average Yield for Thirteen Years. Yield of Straw. Per acre	14th Season, 1901. Variety, Red Fife. Yield of Grain. Per acre.		14th Season, 1901. Variety, Red Fife. Yield of Straw. Per acre	Average Yield for Fourteen Years. Yield of Grain. Per acre.		Average Yield for Fourteen Years. Yield of Straw. Per acre
		Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.
11	Mineral superphosphate, No. 1. 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. No fertilizers have been applied since then............	14	$16\frac{2}{13}$	2,821	16	5	3,750	14	$23\frac{13}{14}$	2,887
12	Unmanured from the beginning...........	9	$47\frac{4}{13}$	1,8[illegible]0	15	5	3,235	10	10	1,931
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12	$1\frac{5}{13}$	1,965	16	5	2,750	12	$18\frac{11}{14}$	2,021
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	15	$7\frac{9}{13}$	2,474	15	—	3,860	15	$7\frac{2}{14}$	2,573
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13	$33\frac{1}{13}$	2,360	17	10	2,850	13	$48\frac{8}{14}$	2,395
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.	15	21	2,134	17	30	2,870	15	$30\frac{8}{14}$	2,187
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12	24	2,343	15	50	2,720	12	$38\frac{10}{14}$	2,370
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12	$27\frac{9}{13}$	1,874	14	20	2,690	12	$35\frac{10}{14}$	1,932
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then......	13	$25\frac{5}{13}$	1,523	16	—	2,035	13	36	1,560
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then......................	12	$26\frac{7}{13}$	1,890	14	50	2,135	12	37	1,908
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been used since then...........	12	$42\frac{12}{13}$	1,882	18	—	2,195	13	6	1,904

BARLEY PLOTS.

The quantity of seed sown per acre on the barley plots was 2 bushels in 1889, 1890 and 1891, 1½ bushels in 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901. Two-rowed barley has been used for seed throughout the whole period. The varieties used were as follows: 1889, 1890 and 1891, Saale; 1892, Goldthorpe; 1893, Duck-bill; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901, Cana-

dian Thorpe, a selected form of the Duck-bill. In 1901 the Canadian Thorpe was sown on April 29, came up May 8, and was harvested from July 25 to 30.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$TH ACRE EACH.

No. of plot.	Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Twelve Years.		13th Season, 1901. Variety, Canadian Thorpe.		Average Yield for Thirteen Years.	
		Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.	Yield of Grain.	Yield of Straw.
		Per acre.	Per acre	Per acre.	Per acre	Per acre.	Per acre
		Bush. lbs.	Lbs.	Bush. lbs.	Lbs.	Bush. lbs.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then	34 $42\frac{4}{12}$	3,019	29 28	3,045	34 $23\frac{7}{13}$	3,021
2	Barn-yard manure, fresh, 15 tons per acre, each year to 1898, inclusive. No manure has been applied since then	35 $12\frac{2}{12}$	3,198	28 26	3,155	34 $35\frac{5}{13}$	3,195
3	Unmanured from the beginning	13 $5\frac{2}{12}$	1,512	10 15	1,120	12 $42\frac{11}{13}$	1,482
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used, no fertilizers have been applied since then	14 $7\frac{5}{12}$	1,430	14 13	1,635	14 $7\frac{11}{13}$	1,446
5	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then............	20 $13\frac{1}{12}$	2,235	21 12	1,850	20 $16\frac{9}{13}$	2,205
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	27 $38\frac{9}{12}$	2,377	22 34	2,605	27 $19\frac{12}{13}$	2,394
7	Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then......................	24 $21\frac{2}{12}$	2,402	27 24	1,785	24 $32\frac{6}{13}$	2,355
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....	19 $31\frac{9}{12}$	1,712	18 46	1,915	19 $29\frac{2}{13}$	1,729
9	Mineral superphosphate, No. 1, 500 lbs. per acre used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then	20 $26\frac{3}{12}$	1,807	14 33	1,105	20 $4\frac{8}{13}$	1,753
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	28 $13\frac{6}{12}$	2,357	18 1	2,755	27 $23\frac{8}{13}$	2,388

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$TH ACRE EACH.

No. of plot.	Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Twelve Years. Yield of Grain. Per acre.		Average Yield for Twelve Years. Yield of Straw. Per acre	13th Season, 1901. Variety, Canadian Thorpe. Yield of Grain. Per acre.		13th Season, 1901. Variety, Canadian Thorpe. Yield of Straw. Per acre	Average Yield for Thirteen Years. Yield of Grain. Per acre.		Average Yield for Thirteen Years. Yield of Straw. Per acre
		Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.
11	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	26	$10\frac{4}{12}$	2,506	19	8	2,220	25	$32\frac{4}{13}$	2,484
12	Unmanured from the beginning..........	12	$43\frac{7}{12}$	1,215	10	10	1,495	12	$33\frac{8}{13}$	1,237
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	13	$43\frac{1}{12}$	1,419	12	19	1,565	13	$37\frac{7}{13}$	1,430
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22	$32\frac{4}{12}$	2,040	21	2	2,180	22	$26\frac{4}{13}$	2,051
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	21	$42\frac{5}{12}$	2,329	18	1	2,400	21	$28\frac{2}{13}$	2,334
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	22	$6\frac{1}{12}$	1,827	20	30	2,035	22	$\frac{7}{13}$	1,843
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	18	$31\frac{10}{12}$	1,933	16	7	2,135	18	$22\frac{7}{13}$	1,949
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	17	$44\frac{10}{12}$	1,692	13	46	1,540	17	$30\frac{2}{13}$	1,680
19	Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then	27	$26\frac{11}{12}$	2,016	21	22	1,810	27	$4\frac{5}{13}$	1,846
20	Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then....	19	$28\frac{10}{12}$	1,605	19	13	1,300	19	$27\frac{8}{13}$	1,582
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..............................	20	$8\frac{4}{12}$	1,794	17	19	1,175	19	$46\frac{1}{13}$	1,746

OAT PLOTS.

The quantity of seed sown per acre on the oat plots, was 2 bushels in 1889 and 1890; 1½ bushels in 1891, 1892 and 1893, and 2 bushels in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901. The varieties used were as follows: In 1889, Early English; in 1890, 1891, 1892, 1893, Prize Cluster; and in 1894, 1895, 1896, 1897, 1898, 1899, 1900 and 1901, Banner. In 1901 the Banner was sown April 30, came up May 8, and the plots were harvested from August 1 to 5.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{10}$ ACRE EACH.

Number of Plot.	Fertilizers applied each Year, from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Twelve Years.			13th Season, 1901. Variety, Banner.			Average Yield for Thirteen Years.		
		Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.
		Per acre.		Per acre	Per acre.		Per acre	Per acre.		Per acre
		Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.
1	Barn-yard manure, well rotted, 15 tons per acre each year to 1898 inclusive. No manure has been applied since then......	50	$26\frac{3}{12}$	3,168	52	22	3,790	50	$31\frac{2}{13}$	3,216
2	Barn-yard manure, fresh, 15 tons per acre each year to 1898 inclusive. No manure has been applied since then...	55	$18\frac{2}{12}$	3,372	53	18	3,805	55	$13\frac{6}{13}$	3,405
3	Unmanured from the beginning...........	31	$33\frac{1}{12}$	1,523	48	3	2,635	33	$7\frac{3}{13}$	1,609
4	Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then.................	31	$22\frac{7}{12}$	1,688	48	28	2,660	32	$33\frac{6}{13}$	1,763
5	Mineral phosphate, untreated, finely ground, 500 lbs. nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then...........	48	$32\frac{2}{12}$	2,679	51	31	2,600	49	$5\frac{8}{13}$	2,673
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then	47	$7\frac{10}{12}$	2,615	53	23	3,570	47	$24\frac{9}{13}$	2,688
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then...........	47	$29\frac{9}{12}$	3,150	56	31	3,415	48	$19\frac{5}{13}$	3,170
8	Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then...... .	41	6	2,371	51	24	3,170	42	$7\frac{5}{13}$	2,432
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been used since then	36	$14\frac{9}{12}$	1,930	42	2	2,155	36	$29\frac{6}{13}$	1,947
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	47	$7\frac{5}{12}$	2,731	45	25	2,[illegible]95	47	$3\frac{7}{13}$	2,721
11	Mineral superphosphate, No. 1, 350 lbs. nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. No fertilizers have been applied since then...	36	$31\frac{7}{12}$	2,414	49	29	27 55	37	$31\frac{5}{13}$	2,410

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{10}$ ACRE EACH—*Continued.*

Number of Plot.	Fertilizers applied each Year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the Autumn.	Average Yield for Twelve Years.			13th Season, 1901. Variety. Banner.			Average Yield for Thirteen Years.		
		Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.	Yield of Grain.		Yield of Straw.
		Per acre.		Per acre	Per acre.		Per acre	Per acre.		Per acre
		Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.	Bush.	lbs.	Lbs.
12	Unmanured from the beginning..........	21	$25\frac{7}{12}$	1,455	30	15	12 70	22	$14\frac{4}{13}$	1,431
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	34	$13\frac{7}{12}$	1,988	34	14	25 85	34	$13\frac{8}{13}$	2,034
14	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	39	$28\frac{7}{12}$	2,203	49	14	27 00	40	$19\frac{5}{13}$	2,241
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	47	$25\frac{4}{12}$	2,686	46	16	33 40	47	22	2,736
16	Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.	36	$14\frac{4}{12}$	2,117	52	32	27 00	37	$23\frac{7}{13}$	2,162
17	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1849, inclusive. No fertilizers have been applied since then.	44	$11\frac{1}{12}$	2,906	50	20	23 00	44	$27\frac{6}{13}$	2,859
18	Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..	36	$6\frac{6}{12}$	2,044	48	28	17 70	37	$5\frac{7}{13}$	2,023
19	Common salt (Sodium chloride) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..............................	35	$28\frac{9}{12}$	1,923	47	32	21 60	36	$26\frac{5}{13}$	1,941
20	Land plaster or gypsum (Calcium sulphate) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then	33	$9\frac{3}{12}$	1,968	41	6	18 20	33	$29\frac{12}{13}$	1,957
12	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then............................	34	$17\frac{9}{12}$	1,828	40	20	21 60	34	$33\frac{8}{13}$	1,854

INDIAN CORN PLOTS.

The experiments with the plots of Indian corn have been conducted with the object of obtaining the largest weight of well matured green fodder for the silo, and to have the corn so far advanced when cut, that the ears shall be as far as is practicable in the late milk, or glazed condition. Each plot has been divided from the outset into two equal parts, on one of which—known as No. 1—one of the stronger growing and somewhat later ripening sorts has been tried, and on the other, marked No. 2, one of the earlier maturing varieties. During the first four years one of the Dent varieties was tested under No. 1. The Mammoth Southern Sweet was tried in 1888, 1889 and 1890. In 1891 the Red Cob Ensilage was used, and in 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899 and 1901 a free growing Flint variety, the Rural Thoroughbred White Flint, was tested. On the other half of the plot (No. 2) the Canada Yellow Flint was used in 1888, 1889 and 1890, the Thoroughbred White Flint in 1891, Pearce's Prolific in 1892, 1893 and 1894, and the Mammoth Eight Rowed Flint in 1895, 1896, 1897, 1898, 1899 and 1901. For the first four years the No. 1 series was planted in drills 3 feet apart,

using about 24 pounds of seed to the acre and thinning the plants, when up, to 6 or 8 inches, and the No. 2 in hills 3 feet apart each way and 4 or 5 kernels in a hill. During the past seven years both sorts have been grown in hills.

In 1900 no crop of Indian corn was grown on these plots, but clover was sown in their place on May 5 in the proportion of twelve pounds per acre. This made a strong growth was cut twice during the season and left on the ground to decay so that when ploughed under the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 20, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep, and harrowed well before the corn was planted. The corn in both series of plots was planted in 1901, on May 25, and cut for ensilage on September 12.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF INDIAN CORN, $\frac{1}{10}$TH ACRE EACH, CUT GREEN FOR ENSILAGE.

No. of Plot.	Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.	Average Yield for Twelve Years.				13th Season, 1901.				Average Yield for Thirteen Years.			
		$\frac{1}{2}$ Plot No. 1—weight of green fodder		$\frac{1}{2}$ Plot No. 2—weight of green fodder		$\frac{1}{2}$ Plot No. 1—Thoroughb'd White Flint weight of green fodder		$\frac{1}{2}$ Plot No. 2—Mam. 8 row-ed, weight of green fodder		$\frac{1}{2}$ Plot No. 1—weight of green fodder		$\frac{1}{2}$ Plot No. 2—weight of green fodder	
		Per acre.		Per acre		Per acre.		Per acre		Per acre.		Per acre	
		Tons	lbs.	Tons	lbs	Tons	lbs.	Tons	lbs	Tons	lbs.	Tons	lbs
1	Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre, each year from 1888 to 1898 inclusive. No manure has been applied since then..	15	1,233	12	131	23	1,810	21	200	16	508	12	1,521
2	Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre each year from 1888 to 1898 inclusive. No manure has been applied since then.............	16	1,323	10	1,809	17	100	17	1,480	16	1,383	11	860
3	Unmanured from the beginning..........	7	323	5	410	9	520	6	1,810	7	646	5	672
4	Mineral phosphate, untreated, finely ground, 800 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' Phosphate was used. No fertilizers have been applied since then................	6	1,840	4	305	18	1,600	15	1,320	7	1,668	5	75
5	Mineral phosphate, untreated, finely ground, 800 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899, 800 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.....................	10	932	8	1,408	22	100	16	1,740	11	714	9	664
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898 500 lbs. of Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then...	15	1,534	11	120	25	810	24	10	16	1,017	12	112
7	Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 500 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.................	14	1,347	10	1,380	25	1,020	19	1,210	15	1,014	11	752

EXPERIMENTS WITH FERTILIZERS, ON PLOTS OF INDIAN CORN—*Concluded.*

No of plot.	Fertilizers applied each year, from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the corn and ploughed under in May, 1901, before the corn was planted.	Average Yield for Twelve Years.				13th Season, 1901.				Average Yield for Thirteen Years.			
		½ Plot No. 1—weight of green fodder		½ Plot No. 2—weight of green fodder		½ Plot No. 1—Thoroughb'd White Flint, weight of green fodder		½ Plot No. 2—Mam. 8 rowed, weight of green fodder		½ Plot No. 1—weight of green fodder		½ Plot No. 2—weight of green fodder	
		Per acre.		Per acre		Per acre.		Per acre		Per acre.		Per acre	
		Tons.	lbs.	Tons	lbs	Tons.	lbs.	Tons	lbs	Tons.	lbs.	Tons	lbs
8	Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive, In 1898 and 1899 500 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then............	11	279	8	456	24	550	22	1,640	12	300	9	701
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then............................	10	264	7	1,309	26	1,600	23	110	11	828	8	1,678
10	Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12	1,854	10	39	25	20	20	1,200	13	1,713	10	1,667
11	Mineral superphosphate, No. 1, 350 lbs. ; nitrate of soda, 200 lbs. ; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. No fertilizers have been applied since then..	15	944	11	1,146	28	1,800	23	1,310	16	1,010	12	1,005
12	Unmanured from the beginning...........	10	202	8	500	23	610	19	800	11	233	9	215
13	Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	11	327	8	1,145	24	760	20	1,400	12	360	9	1,011
14	Bone, finely ground 500 lbs. ; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	11	1,461	8	1,497	24	1,700	22	620	12	1,482	9	1,583
15	Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..	12	384	9	607	22	1,430	18	800	13	3	10	7
16	Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then ..	12	1,009	9	1,239	23	600	20	300	13	662	10	859
17	Mineral superphoshate, No. 1, 600 lbs. ; muriate of potash, 200 lbs. ; sulphate of ammonia, 150 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	12	1,297	8	1,773	25	1,590	23	110	13	1,320	9	1,953
18	Muriate of potash, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	8	1,138	5	1,534	25	1,260	21	960	9	1,762	6	1,951
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and '90 ; (muriate of potash, 200 lbs., substituted each year since) ; dried blood, 300 lbs. ; mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then..	11	458	7	1,225	25	1,830	23	940	12	717	8	1,665
20	Wood ashes, unleached, 1,900 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.	9	1,016	6	1,841	26	800	22	1,500	10	1,615	8	276
21	Bone, finely ground, 500 lbs.; sulphate of ammonia, 200 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then......... ..	12	222	6	692	23	750	21	840	12	1,955	7	1,011

PLOTS OF MANGELS AND TURNIPS.

In conducting these experiments the roots only have been taken from the land, the tops have always been cut off and left on the ground to be ploughed under, so that the plant food they have taken from the soil may be returned to it. One-half of each one-tenth acre plot in the series has been devoted to the growth of mangels, and the other half to turnips, and these crops have been alternated from year to year. The preparation of the land has been the same for both these roots. It was ploughed in the autumn after the crop was gathered, gang-ploughed deeply in the spring after the barn-yard manure had been spread on plots 1, 2 and 6, and after gang-ploughing the other fertilizers were spread by scattering them evenly over the surface, after which it was all harrowed with the smoothing harrow, then made in ridges 2 feet apart, rolled and sown.

In 1889, the variety of mangel used was the Mammoth Long Red. In 1890, three varieties were sown: 15 rows of Mammoth Long Red, 6 of Mammoth Long Yellow, and 6 of Golden Intermediate on each plot. In 1891, each plot again had three varieties: 18 rows of Mammoth Long Red, 3 of Yellow Fleshed Tankard, and 6 of Golden Tankard. In 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899 and 1901, one variety only was used, namely, the Mammoth Long Red. About 4 pounds of seed were sown per acre each year.

Two varieties of turnips were sown on the half plots devoted to these roots in 1889; 25 rows of Carter's Prize Winner, and 2 rows of Carter's Queen of Swedes, and in 1890, a single variety, Carter's Elephant Swede. In 1891, six varieties were sown; 6 rows of Lord Derby Swede, 4 of New Giant King, 3 of Imperial Swede, 6 of Champion Swede, 4 of Purple Top Swede, and 4 of East Lothian Swede. In 1892 the Improved Purple Top Swede only was sown, in 1893 and 1894 the Prize Purple Top Swede, in 1895 the Imperial Swede, and in 1896, 1897, 1898, 1899 and 1901 the Prize Purple Top Swede. The land used for the turnips, which are usually sown later than the mangels, was prepared in the same manner and the fertilizers spread on it at the same time as for the mangels. It was then allowed to stand until the day before sowing, when it was gang-ploughed shallow or cultivated to kill weeds and loosen the soil, ridged, rolled and sown. About three pounds of seed were sown per acre.

In 1900 no crops of mangels and turnips were grown, but clover was sown in their place on May 5 in the proportion of twelve pounds per acre. This made a strong growth, and was cut twice during the season, and left on the ground to decay so that when ploughed under the land might get the full benefit of the clover crop. The clover was allowed to remain growing until May 10, 1901, by which time it had made a very heavy growth. It was then ploughed under about six inches deep and harrowed well, then made up into ridges two feet apart. These were rolled with a hand roller, which flattened the ridges considerably and made a firm, even seed bed. It is proposed to alternate the crops of clover and roots in this way for some years for the purpose of gaining information as to the fertilizing effect of crops of green clover ploughed under on land to be used for growing roots.

In 1901 the mangels were sown on May 13, and pulled on October 14; the turnips were sown May 22, and pulled October 22. The yield per acre has been calculated in each case from the weight of roots gathered from two rows, each 66 feet long.

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND TURNIPS $\frac{1}{20}$TH ACRE EACH.

No. of Plot.	Fertilizers applied each Year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1901, before the roots were sown.	Average Yield for Eleven Years. Mangels, Weight of Roots. Per Acre.		Average Yield for Eleven Years. Turnips, Weight of Roots. Per Acre.		12th Season, 1901. Varieties. West Half Plot. Mangels, Mammoth Long Red: Weight of Roots. Per Acre.		12th Season, 1901. Varieties. East Half Plot. Turnips, Purple Top Swede: Weight of Roots. Per Acre.		Average Yield for Twelve Years. Mangels, Weight of Roots. Per Acre.		Average Yield for Twelve Years. Turnips, Weight of Roots. Per Acre.	
		Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.
1	Barn-yard manure (mixed horse and cow manure) well rotted, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then...........	22	1,174	15	183	22	160	21	320	22	1,089	15	1,194
2	Barn-yard manure (mixed horse and cow manure) fresh, 20 tons per acre each year from 1889 to 1898 inclusive. No manure has been applied since then...............	21	1,090	15	607	21	500	20	1,590	21	1,041	15	1,522
3	Unmanured from the beginning.....	8	1,587	6	1,863	9	1,610	12	1,820	8	1,756	7	859
4	Mineral phosphate, untreated, finely ground, 1,000 lbs. per acre, used each year from 1889 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' Phosphate was used. No fertilizers have been applied since then.....	8	644	7	593	9	940	14	1,520	8	835	7	1,837
5	Mineral phosphate, untreated, finely ground, 1,000 lbs., nitrate of soda, 250 lbs. wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.	13	1,732	9	1,436	19	350	13	1,130	14	617	10	77
6	Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate untreated, finely ground, 1,000 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1889 to 1897 inclusive. In 1898 1,000 lbs. of Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..	17	1,799	13	536	20	1,380	11	1,800	18	264	13	308
7	Mineral phosphate, untreated, finely ground, 1,000 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1897 inclusive. In 1898 and 1899 1,000 lbs. of the Thomas' Phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then....	10	1,472	9	1,012	16	440	10	1,650	11	386	9	1,232
8	Mineral superphosphate, No. 1, 500 lbs.; sulphate of potash, 200 lbs. in 1889 and 1890 (substituted by muriate of potash, 250 lbs. in 1891 and subsequent years); nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...........................	13	1,725	11	1,730	13	820	15	1,720	13	1,649	12	396

EXPERIMENTS WITH FERTILIZERS ON ROOTS; PLOTS OF MANGELS AND TURNIPS—*Concluded.*

No. of plot.	Fertilizers applied each Year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1900 in place of the roots and ploughed under in May, 1900, before the roots were sown.	Average Yield for Eleven Years.				12th Season, 1901, Varieties.				Average Yield for Twelve Years.			
		Mangels, Weight of Roots.		Turnips, Weight of Roots.		West Half Plot. Mangels, Mammoth Long Red: Weight of Roots.		East Half Plot. Turnips, PurpleTop Swede: Weight of Roots.		Mangels, Weight of Roots.		Turnips, Weight of Roots.	
		Per Acre.		Per Acre.		Per Acre.		Per Acre.		Per Acre.		Per Acre.	
		Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.	Tons.	lbs.
9	Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..	9	120	8	1,327	10	770	15	1,180	9	341	9	481
10	Nitrate of soda, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	14	520	9	134	13	220	15	700	14	328	9	1,181
11	Sulphate of ammonia, 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...........	10	145	10	667	12	860	16	1,250	12	538	10	1,715
12	Unmanured from the beginning	7	354	6	1,677	7	1,490	11	1,340	7	449	7	482
13	Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then..... . .	10	196	8	616	12	1,950	13	850	12	675	8	1,469
14	Wood ashes, unleached, 2,000 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.....	10	1,508	7	1,107	13	40	13	1,060	10	1,886	8	103
15	Common salt (Sodium chloride) 400 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.. ...	9	961	7	21	12	680	12	900	9	1,437	7	927
16	Mineral superphosphate, No. 1, 500 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...........	13	589	10	711	10	690	17	1,080	13	173	10	1,908
17	Mineral superphosphate, No. 1, 350 lbs; wood ashes, unleached, 1,500 lbs per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then ..	12	985	9	31	16	660	20	690	12	1,624	9	1,919
18	Mineral superphosphate, No. 1, 500 lbs.; muriate of potash, 200 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...........	12	415	9	1,900	19	60	19	200	12	1,552	10	1,425
19	Double sulphate of potash and magnesia, 300 lbs. per acre in 1889 and 1890 (muriate of potash, 200 lbs., substituted each year since); dried blood, 250 lbs.; mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then.................	13	1,150	11	737	20	1,460	17	1,950	14	342	11	1,838
20	Wood ashes, unleached, 1,500 lbs.; common salt (Sodium chloride), 300 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...	14	202	10	183	20	700	19	530	14	1,244	10	1,712
21	Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...	14	1,190	10	903	16	600	17	680	14	1,482	11	51

DISTRIBUTION OF SAMPLES OF SEED GRAIN, ETC., TO FARMERS FOR TRIAL.

Another distribution was made in the spring of 1901, consisting of samples of the most promising sorts of oats, spring wheat, barley, pease, Indian corn and potatoes. By the careful growing of one of these samples, the product will soon be sufficient to sow a large area, and thus in a short time the farmer can provide himself with some of the best sorts, without cost beyond that of his own labour. From the large number of appreciative letters received from farmers who have had these samples and have grown from them the seed grain they are now using on their farms, it is evident that this branch of the work of the experimental farms is doing a vast amount of good, and is rapidly accomplishing the object for which it was instituted, namely, the general introduction among farmers throughout the Dominion of the best and most productive sorts of these important farm crops. Another proof of the appreciation in which this distribution is held is the very large demand each year for such samples.

The samples sent out from the Central Experimental Farm during the early months of 1901 were distributed as follows:—

Name of Grain.	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-west Territories.	British Columbia.
Oats	371	763	1,012	2,589	1,304	1,422	640	87
Barley	105	278	280	734	305	321	143	27
Wheat	271	381	789	1,856	515	474	243	28
Pease	74	376	337	654	419	627	343	59
Indian corn	27	156	85	451	429	167	56	15
Potatoes	147	511	1,058	1,400	1,256	1,045	460	189
Total	995	2,465	3,561	7,684	4,228	4,056	1,885	405

Total number of samples distributed 25,279
Number of applicants supplied 25,231

The following list shows the number of 3-pound packages of the different varieties which have been sent out:—

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
OATS.		BARLEY.	
		Six-rowed.	
Improved Ligowo	2,325	Mensury	840
Banner	1,181	Royal	566
Siberian	1,115	Odessa	228
American Beauty	897	Oderbruch	117
Golden Beauty	798		
Bavarian	795	*Two-rowed.*	
Abundance	403	Sidney	354
Wide Awake	354	Canadian Thorpe	58
Bonanza	120	French Chevalier	30
White Schonen	103		
Tartar King	91		
Waverley	3		
Goldfinder	3		
Total	8,188	Total	2,193

Name of Variety.	Number of Packages.
WHEAT.	
Red Fife	1,151
Preston	916
White Fife	560
White Connell	539
Stanley	484
Percy	392
Wellman's Fife	238
Monarch	191
Hungarian	69
Dufferin	17
Total	4,557
PEASE.	
Prussian Blue	675
Large White Marrowfat	533
Canadian Beauty	498
French Canner	486
Creeper	311
Black Eyed Marrowfat	237
Golden Vine	149
Total	2,889
INDIAN CORN.	
Selected Leaming	492
Longfellow	284
Angel of Midnight	125
White Cap Yellow Dent	119
Early Butler	89
Early Mastodon	78
Mitchell's Early	72
Mammoth Cuban	54
Champion White Pearl	39
Compton's Early	34
Total	1,386
POTATOES.	
Carman No. 1	850
American Wonder	752
Early Sunrise	718
POTATOES—*Con.*	
Everett	625
Early Harvest	519
Empire State	466
Burnaby Seedling	458
Rochester Rose	402
Early Rose	165
Sir Walter Raleigh	109
Canadian Beauty	102
Early Andes	101
Early White Prize	97
Bovee	96
Uncle Sam	95
Vigorosa	92
New Queen	91
Honeoye Rose	77
Prolific Rose	76
Prize Taker	65
Wonder of the World	23
Early Six Weeks	14
Rose of the North	10
Beauty of Hebron	8
Gem of Aroostook	7
Holborn Abundance	7
Brown's Rot Proof	3
White Elephant	2
Maggie Murphy	2
Irish Daisy	2
Lizzie's Pride	2
Dakota Red	2
Early Norther	2
Sharpe's Seedling	2
State of Maine	2
Late Puritan	2
Additional varieties of which only one sample of each was sent	20
Total	6,066
Total number of packages distributed :—	
Wheat	4,557
Oats	8,188
Barley	2,193
Pease	2,889
Corn	1,386
Potatoes	6,066
Total	25,279

DISTRIBUTION OF SAMPLES OF GRAIN SUFFICIENT FOR ONE-TENTH OF AN ACRE.

The distribution of grain in larger samples sufficient in each case for a one-tenth acre plot was begun in 1899, and continued in 1900 and 1901. These samples were sent to a special list of farmers selected from among those who have shown a special interest in this important work. In preparing the list for this purpose the names have been chosen from every part of the Dominion so that every agricultural constituency has been represented.

These special samples to the number of 2,858 have been distributed by provinces as follows :—

DISTRIBUTION of samples of grain sufficient for one-tenth of an acre.

Name of Grain.	P. E. I.	N. S.	N. B.	Quebec.	Ontario.	Man.	N.W.T.	B. C.
Oats	58	151	164	655	847	112	69	24
Spring Wheat	41	37	91	193	72	19	12	5
Barley	15	21	33	127	77	27	6	2
Total	114	209	288	975	996	158	87	31

The following list shows the number of these larger packages of the different varieties which have been sent out:—

Name of Variety.	Number of Packages.	Name of Variety.	Number of Packages.
OATS.		WHEAT—*Con.*	
Waverley	465	Wellman's Fife	2
Tartar King	411	Total	471
Improved Ligowo	346		
American Beauty	288		
Banner	237		
Golden Beauty	128	BARLEY.	
Siberian	110		
Goldfinder	94	Mensury	199
		Royal	109
Total	2,079		
		Total	308
WHEAT.			
		Oats	2,079
Preston	251	Wheat	471
Percy	122	Barley	308
Stanley	94		
Red Fife	2	Total	2,858

DISTRIBUTION OF SAMPLES FROM THE BRANCH EXPERIMENTAL FARMS.

Samples of three pounds each were also distributed from the branch experimental farms as follows:—

Experimental Farm, Nappan, N.S.—		Potatoes	652
Oats	260		
Wheat	89		1,629
Barley	78		
Pease	22		
Buckwheat	10	Experimental Farm, Brandon, Man.—	
Winter Rye	8	Samples of grain of all sorts	555
Potatoes	278	Potatoes	334
	745		889
Experimental Farm, Indian Head, N.W.T.—		Experimental Farm, Agassiz, B.C.—	
Oats	414	Oats	246
Barley	68	Barley	184
Wheat	252	Wheat	168
Pease	200	Pease	87
Flax, Rye, &c	43	Potatoes	259
			944

These samples added to the number distributed by the Central Experimental Farm make a total of 32,344. It is gratifying to find that farmers generally are paying much more attention than formerly to the selection of the best and most productive sorts for seed.

TESTS OF THE VITALITY OF SEED GRAIN AND OTHER SEEDS FOR 1901.

The number of samples of seed grain and other seeds which were tested during the season of 1901 to ascertain the proportion which would germinate was 2,385. Many of the samples sent for test are much below the average in vitality, and for this reason do not fairly represent the vitality of grain of average quality grown in different parts of the Dominion. The main object in continuing these tests from year to year is to give farmers the opportunity of having any samples which may be of doubtful vitality, through injury during harvesting or storing, thoroughly tested so that their value for seed purposes may be known. Samples may be sent free through the mail, about one ounce is sufficient and the work is done and reported on free of charge. The vitality of samples can usually be ascertained within a fortnight after they are received.

RESULTS OF TESTS OF SEEDS FOR VITALITY, 1900-1.

Kind of Seed.	Number of Tests.	Highest Percentage.	Lowest Percentage.	Percentage of Strong Growth.	Percentage of Weak Growth.	Average Vitality.
Wheat	900	100·0	8·0	78·5	5·7	84·2
Barley	312	100·0	11·0	78·0	7·5	85·5
Oats	972	100·0	0·0	82·5	5·4	87·9
Rye	2	85·0	4·0	41·5	3·0	44·5
Peas	90	98·0	14·0	....	......	84·0
Corn	12	100·0	2·0	....	....	67·0
Grass	14	97·0	14·0	....	....	59·7
Clover	6	80·0	6·0	....	....	41·5
Flax	9	88·0	12·0	....	....	49·1
Carrots	17	82·0	11·0	....	....	41·0
Turnips	8	82·0	8·0	....	....	53·0
Mangels	10	86·0	60·0	....	....	73·2
Sugar Beets	9	98·0	34·0	....	....	75·1
Radish	11	94·0	46·0	....	....	73·5
Cabbage	6	81·0	13·0	....	....	59·1
Beans	2	72·0	0·0	....	....	36·0
Tobacco	2	32·0	31·0	....	....	31·5
Canary Seed	1	62·0	62·0	....	....	62·0
Cucumber	1	42·0	42·0	....	....	42·0
Total number of samples tested, highest and lowest percentage...	2,384	100·0	0·0	....	....	....

(Signed) WILLIAM T. ELLIS.

TABLE showing the Results of Grain Tests for each Province.

ONTARIO.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	179	100·0	19·0	60·3	11·8	72·2
Barley	112	100·0	11·0	72·2	11·3	83·5
Oats	181	100·0	47·0	90·6	4·2	94·8

QUEBEC.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	56	100·0	27·0	82·5	5·3	87·9
Barley	17	100·0	64·0	83·3	6·3	89·7
Oats	82	100·0	23·0	81 7	5·5	87·2

MANITOBA.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	441	100·0	8·0	83·0	4·2	87·2
Barley	121	100·0	21·0	82·0	5·0	87 0
Oats	376	100·0	26·0	84·6	5·6	90·3

NORTH-WEST TERRITORIES.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	154	100·0	39·0	82·2	3·5	85·7
Barley	38	100·0	39·0	75·1	6·2	81·3
Oats	229	100·0	0·0	68·8	6·9	75·7

NOVA SCOTIA.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	25	100·0	52·0	82·4	5·0	87·4
Barley	15	99·0	78·0	83·6	6·3	89·9
Oats	31	100·0	81·0	89·9	3·1	93·1

NEW BRUNSWICK.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	26	100·0	59·0	87·2	4·0	91·2
Barley	4	100·0	97·0	97·5	1·2	98·7
Oats	32	100·0	85·0	90·9	4·2	95·2

PRINCE EDWARD ISLAND.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	16	98·0	72·0	82·6	5·1	87·7
Barley	5	98·0	72·0	81·0	8·4	89·4
Oats	40	100·0	76·0	92·5	3·6	96·1

BRITISH COLUMBIA.

Kind of Seed.	Number of Tests.	Highest Per-centage.	Lowest Per-centage.	Per-centage of Strong Growth.	Per-centage of Weak Growth.	Average Vitality.
Wheat	3	99·0	95·0	96·3	0·3	96·6
Barley	0	0·0	0·0	0·0	0·0	0·0
Oats	1	94·0	94·0	91·0	3·0	94·0

METEOROLOGICAL OBSERVATIONS.

Table of Meteorological Observations taken at the Central Experimental Farm, Ottawa, 1901; maximum, minimum and mean temperature for each month, with date of occurrence, also rainfall and snowfall and total precipitation.

Months.	Maximum.	Minimum.	Range.	Mean.	Highest.	Date.	Lowest.	Date.	Rainfall.	Snowfall.	Total Precipitation.	Number of days, Precipitation.	Heaviest in 24 hours.	Date.
	°	°	°	°	°		°		in.	in.	in.		in.	
Jan	21·30	0·59	20·54	10·86	38·8	16th	—25·5	20th	0·17	32·50	3·42	18	1·30	12th
Feb......	19·84	0·62	19·21	10·22	29·5	19th	—11·8	3rd	0·00	14·00	1·40	7	0·60	4th
March...	32·30	15·13	17·16	23·71	40·5	24th	— 9·5	3rd	1·65	22·25	3·87	18	0·71	27th
April	55·78	36·70	19·08	46·24	79·8	28th	5·0	3rd	3·82	1·50	3·97	16	0·74	4th
May.....	67·07	46·66	20·37	56·84	81·2	8th	36·0	15th	4·36	......	4·36	17	0·95	18th
June.....	78·56	55·52	23·03	67·03	96·8	28th	42·8	8th	3·79	......	3·79	12	1·02	23rd
July.. ..	82·36	59·86	22·49	71·10	99·0	16th	47·9	25th	4·44	......	4·44	14	1·48	30th
August ..	79·58	57·13	22·44	68·35	89·8	12th	49·2	5th	3·12	......	3·12	14	1·44	10th
Sept.	70·95	49·55	21·40	60·25	90·0	5th	33·0	20th	2·98	.. ..	2·98	8	1·17	29th
October..	56 81	38·16	18·65	47·48	72·0	12th	24·8	25th	1·63	s	1·63	12	0·45	19th
Nov	34·69	21·78	13·00	28·28	58·0	1st	— 3·0	29th	1·30	13·75	2·67	16	0·83	25th
Dec......	26·34	11·35	14·98	18·84	53·0	14th	—14·3	16th	1·95	13·25	3·26	15	1·55	15th
									29·21	97·25	38·91	167		

Rain or snow fell on 167 days during the 12 months. .

Heaviest rainfall in 24 hours, 1·48 inches on July 30.

Heaviest snowfall in 24 hours, 13·00 inches on January 12.

It will be seen the highest temperature during the 12 months was 99°·0 on July 16.

The lowest temperature during the 12 months was—25° ·5 on January 20.

During the growing season rain fell on 16 days in April, 17 days in May, 12 days in June, 14 days in July, 14 days in August, and 8 days in September.

September shows the lowest number of days on which rain fell, viz., 8.

Rain or snow fell on 18 days in January and March.

Total precipitation during the 12 months, 38·91 inches, as compared with 40·27 inches during 1900.

RAINFALL, Snowfall and total Precipitation from 1890 to 1901, also the average annual amount that has fallen.

Year.	Rainfall.	Snowfall.	Total Precipitation.
	In inches.	In inches.	In inches.
1890	24·73	64·85	31·22
1891	30·19	73·50	37·54
1892	23·78	105·00	34·28
1893	31·79	72·50	39·04
1894	23·05	71·50	30·20
1895	27 01	87·50	35·76
1896	21·53	99·75	31·50
1897	24·18	89·00	33·08
1898	24·75	112·25	36·02
1899	33 86	77·25	41·63
1900	29·48	108 00	40·27
1901	29·21	97·25	38·91
Total	323·56	1,058·35	429·45
Yearly average for 12 years	26·96	88·19	35·78

RECORD of Sunshine at the Central Experimental Farm, Ottawa, for the Years 1898, 1899, 1900 and 1901.

Months.	1898. Number of days with Sunshine.	Number of days without Sunshine	Total hours Sunshine.	Average Sunshine per day.	1899. Number of days with Sunshine.	Number of days without Sunshine	Total hours Sunshine.	Average Sunshine per day.	1900. Number of days with Sunshine.	Number of days without Sunshine	Total hours Sunshine.	Average Sunshine per day.	1901. Number of days with Sunshine.	Number of days without Sunshine	Total hours Sunshine.	Average Sunshine per day.
January...	21	10	97·4	3·14	18	13	91·2	2·94	18	13	76·4	2·46	20	11	94·6	3·05
February ..	15	13	67·5	2·41	19	9	102·1	3·64	20	8	110·2	3·93	20	8	120·9	4·31
March.	26	5	171·5	5·53	17	14	124·1	4·00	26	5	177·9	5·73	19	12	82·4	2·65
April	29	1	233·8	7·79	26	4	228·8	7·62	26	4	212·7	7·09	18	12	137·1	4·57
May......	30	1	186·3	6·01	27	4	225·4	7·27	27	4	241·6	7·79	25	6	200·8	6 47
June.......	29	1	184·9	6·16	29	1	257·1	8·57	27	3	282·2	9·40	29	1	269·4	8·98
July......	30	1	272·8	8·80	29	2	271·3	8·75	29	2	225·1	7·26	29	2	245·8	7·92
August	Instrum'ts out of order.				31	0	271·2	8·74	30	1	270·7	8·73	29	2	226·1	7·29
September..	27	3	166·9	5·23	22	8	128·9	4·29	22	8	164·4	5·48	26	4	202·3	6·74
October....	21	10	106·0	3·41	23	8	120·4	3·88	26	5	148·7	4·79	27	4	126·3	4·07
November..	21	9	91·3	3·04	17	13	77·0	2·56	18	12	71·7	2·39	19	11	72·4	2·41
December...	15	16	54·3	1·75	17	14	50·1	1.61	16	15	34·0	1·09	16	15	45·4	1·46

(Signed) WILLIAM T. ELLIS,
Observer.

CORRESPONDENCE.

The great volume of correspondence continually passing between Canadian farmers and the officers of the Experimental Farms is a gratifying evidence of the usefulness of the work conducted and of the appreciation in which it is held. A large proportion of the letters received are letters of inquiry from correspondents seeking information on all sorts of farm subjects.

CENTRAL EXPERIMENTAL FARM.

The following is a summary of the letters received and sent out at the Central Experimental Farm from November 30, 1900, to November 30, 1901, also the number of reports, bulletins and circulars forwarded by mail during the same period:—

	Letters received.	Letters sent.
Director....	35,711	17,094
Agriculturist....	1,470	1,533
Horticulturist ..	1,163	1,209
Chemist	1,213	1,127
Entomologist and Botanist	3,058	2,840
Poultry Manager ..	1,575	1,078
Accountant ..	1,123	1,293
	45,313	26,174

A large number of letters received by the Director are applications for the publications of the farms or for samples of grain. A considerable proportion of these are

answered by sending the correspondents the material asked for. This will explain why the number received so much exceeds the number sent out.

Circular letters sent, including circulars sent with samples of seed grain	34,160
Reports and bulletins mailed	257,617

BRANCH EXPERIMENTAL FARMS.

The correspondence with the superintendents of the branch experimental farms is also large as will be seen from the following figures:—

	Letters received.	Letters sent.
Experimental Farm, Nappan, N.S.	1,416	1,211
Experimental Farm, Brandon, Man.	4,804	2,755
Experimental Farm, Indian Head, N.W.T.	5,410	5,333
Experimental Farm, Agassiz, B.C.	2,518	2,378
	14,148	11,677

Much additional information has also gone out from the branch farms in printed circulars.

Adding the correspondence received at the Branch Experimental Farms to that of the Central Farm, we find that 59,461 letters were received, and 36,851 sent out during the past year in addition to the vast amount of information distributed in reports, bulletins and circulars.

EXPERIMENTS IN TREE PLANTING ON SABLE ISLAND.

Sable Island lies in the Atlantic about 90 miles east from the nearest point in Nova Scotia, and about 153 miles from Halifax. In form it is a long, slender, open crescent with the hollow side facing the mainland and running out to a point at either end. It is about 21 miles long, and at its widest parts is more than a mile across; a good portion of the middle of the island is occupied by a lagoon of salt water known as Lake Wallace, which at some points covers nearly half the width of the island and extends for more than half its length. A break has occurred in the south bar which forms the southern boundary of this lagoon through which the sea water enters in considerable volume.

WASTING OF THE ISLAND BY THE ACTION OF THE SEA.

The island consists in the main of white sand forming banks and hills of varying height. The strong winds which prevail at certain periods, sometimes play havoc with these sandy elevations, thus continually altering the configuration of the land. The sea has made great inroads on the west end of the island and has within the memory of the present residents washed away several miles of that end which has made it necessary to remove the lighthouse there twice within fifteen years. Early surveys give the length of the island as about 40 miles, and two miles or more in width, showing that great waste has occurred. Dangerous shoals and sand bars extend on all sides, and the strong ocean currents from the south and the north which set in about the island, often carry vessels out of their course. Add to this the prevalence of fogs which obscure the land from view and you have a combination of dangerous conditions which have brought about the destruction of many good ships and involved the loss of hundreds of lives.

MANY DISASTROUS WRECKS.

The appalling loss of life and property which has occurred in this dangerous spot early led to the establishment there of life saving stations. These were organized by the government of Nova Scotia in 1801, and maintained by that province until confederation took place, when this service was undertaken by the Dominion. The British government contributes £500 a year towards the cost of carrying on this good work.

Many disastrous wrecks have occurred here. The first of these recorded was in 1583, when the *Admiral,* a vessel in the navy of Queen Elizabeth, was wrecked and nearly 100 lives lost. Up to the present time no less than 171 known wrecks have occurred. The last wreck of importance, comparatively speaking, was that of the steamship *Moravian,* from Antwerp to Boston. This was a vessel of 2,000 tons, which struck on a sand bar on the 12th of February, 1899, and broke up the following June. There were 40 persons on this steamship, 21 of whom reached the island in their own boats, while 19 were rescued by the island lifeboats. No one was drowned in this instance, but one man died from the effects of exposure. It has been truly said that 'no other island on this globe can show so appalling a record of shipwreck and disaster.'

THE ISLAND TREELESS.

There are no trees on Sable Island to break the force of the winds, which sometimes blow fiercely and raise dense clouds of drifting sand. The gradual wasting of the island and the lessening of its surface has led to the consideration of the possibility of establishing tree growth there, that thus the land might become more fixed and further lessening of the surface be retarded if not prevented.

INVESTIGATIONS LOOKING TO TREE PLANTING.

During the early part of 1900, I was requested by the Minister of Marine and Fisheries, Sir Louis Davies, to consider the subject of a somewhat extensive experiment in tree planting on Sable island, and if this was thought feasible to make the necessary arrangements to obtain a sufficient number of such trees as would be desirable for that purpose. Having obtained the ready concurrence of the Hon. Minister of Agriculture to devote such time as was necessary to carry out this object, steps were taken to gain information on the subject. From the outset I have had the hearty cooperation of the deputy minister, Lieut.-Col. F. F. Gourdeau, who has been most enthusiastic in the work, and has been of the greatest assistance to me. During my visit to the Paris Exposition in 1900, a journey was made to the sea coast of Brittany with Lieut.-Col. Gourdeau to see the results of the planting of pine forests there on the drifting sands on the ocean shore, to gain information as to the methods adopted in planting and the varieties of trees which have been successfully grown.

We found large districts planted with pine trees growing thriftily, although slowly, on what 50 or 60 years ago was a bare and barren coast covered with drifting sand. Formerly houses and villages were at times engulfed by these terrible drifts, but under the influence of this successful planting, the drifting of the sand has long since ceased and a soil is gradually, though slowly, forming mainly through the decay of successive crops of the needle-like leaves of the pines. A careful survey of the district showed that the trees were almost all of one species known as the maritime pine *Pinus pinaster* (*P. maritima*) known also in Europe as the cluster pine. In that locality it is a rather small growing tree with large long leaves and very large cones. The trees throughout the district of country visited between St. Nazaire and Baule seemed to range from 20 to about 50 years of age ; their height was from 15 to 25 feet, and the trunks of some of the larger specimens, when measured, three feet from the ground showed a diameter of about 12 inches. Specimens of other species of pine were occasionally found growing

with the maritime pine especially *Pinus sylvestris,* and notes were taken on these as to their comparative vigour of growth on the apparently pure sand of the district. A careful study was also made of other varieties of trees and shrubs seen growing here and there on that soil, and a complete list made with notes on their growth. The information thus gained was subsequently used to good purpose when selecting the material to be tested on Sable Island.

VISIT TO NORMANDY.

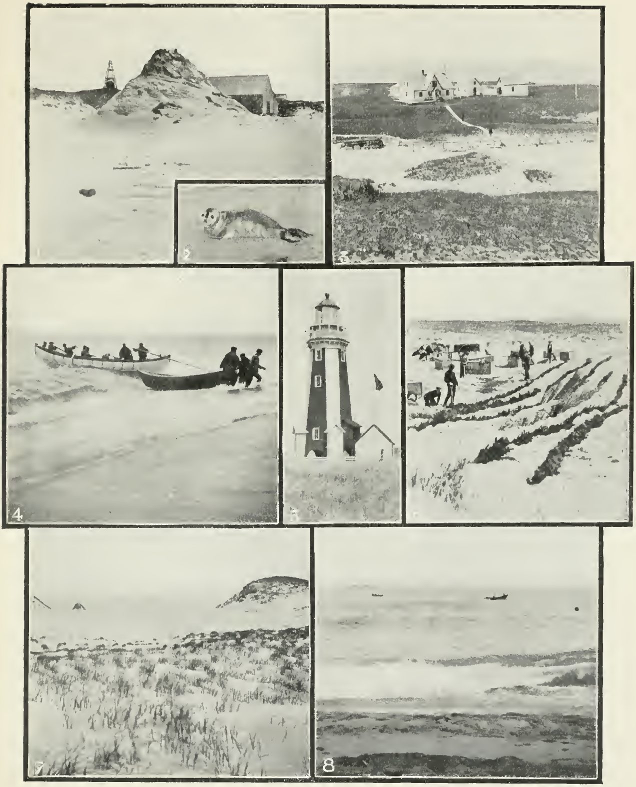
I also made a journey to the district of Calvados in Normandy, which is known throughout the world among nurserymen for its large tree-growing establishments, where an immense number of young forest trees are produced. With an excellent climate for this purpose, cheap labour and long hours for work, and the employment of the best methods, young trees are produced there of thrifty growth in millions, and with such advantages they can be supplied at very low rates. The stock of one of the larger nurseries was inspected and plenty of suitable material found. The maritime pine especially was grown in very large quantities, as this tree is extensively planted in many parts of France. Many other species of pine and other evergreen trees were also available there with a large assortment of deciduous trees and shrubs.

SELECTION OF SUITABLE VARIETIES.

On returning to Ottawa a list of such sorts as were likely to be suitable was prepared with quantities desired. The trees and shrubs chosen included a large number of those which have succeeded well in drifting sands in France to which were added a number of other varieties which from Canadian experience were likely to prove useful for that purpose. Small lots of many other species were added to lend interest to the collection and to test their hardiness and adaptability to the climate of Sable Island. This list included in all 68,755 evergreens of 25 varieties, and 12,590 deciduous sorts of 79 varieties, a total of 81,345, made up as follows:—

TREES BROUGHT FROM FRANCE.

Number	Name.
	Evergreens.
10,000	*Pinus pinaster = P. maritima*, Maritime or Cluster Pine.
10,000	" *sylvestris*, Scotch Pine.
10,000	" " *rigaensis*, Riga Pine.
10,000	" *Laricio nigricans*, Austrian Pine.
5,000	" *Montana*, Mountain Pine.
2,500	" *Montana Mughus*, Dwarf Mountain Pine.
2,500	" *strobus*, White Pine.
100	" *rigida*, Pitch Pine.
50	" *cembra*, Stone Pine.
10,000	*Abies excelsa*, Norway Spruce.
2,500	" *balsamea*, Balsam Spruce.
2,500	" *alba*, White Spruce.
1,000	" *nigra*, Black Spruce.
1,000	*Juniperus virginiana*, Red Cedar.
1,000	" *communis*, Common Juniper.
500	*Thuya occidentalis*, arbor vitæ.
10	" *columbia.*
10	" *Elwangeriana.*
10	" *globosa.*
10	" *Hoveyi.*
10	" *lutea.*
10	*Cupressus pisifera filifera*, Thread-like Retinospora.
10	" " *plumosa*, Plumose Retinospora.
10	" " *plumosa aurea.*
25	*Taxus baccata*, European Yew.
	Deciduous Trees and Shrubs.
500	*Acer Negundo*, Box Elder.
500	" *platanoides*, Norway Maple.
10	" " *Schwedleri*, Schwedler's Norway Maple.
50	" *saccharinum*, Sugar Maple.
50	" *tataricum*, Tartarian Maple.
25	*Vitis (Ampelopsis) quinquefolia*, Virginia Creeper.
10	" *Thunbergii*, Japan Ivy.
5	*Aristolochia sipho*, Dutchman's Pipe.
25	*Berberis vulgaris foliis purpureis*, Purple Barberry.
10	" *Thunbergi*, Thunberg's Barberry.
2,000	*Betula alba*, European White Birch.
10	" " *laciniata pendula*, Cut-leaved Birch.



Scenes on Sable Island.

1. Landing place with lookout in the distance. 2. Young seal on the shore. 3. Residence of Superintendent.
4. Surfboat pulling through the breakers. 5. Lighthouse at East point. 6. Heeling in young forest trees.
7. Sand binding grass with plain of drifting sand beyond. 8. Surf boats on way to steamer for supplies.

TREES BROUGHT FROM FRANCE—*Concluded.*

Number	Name.	Number	Name.
	Deciduous Trees and Shrubs—Con.		*Deciduous Trees and Shrubs*—Con.
25	*Betula lutea*, Yellow Birch.	200	*Populus alba*, Silver Poplar.
25	" *nigra*, River Birch.	200	" *balsamifera*, Balsam Poplar.
10	*Tecoma grandiflora*, Trumpet Flower.	200	" *deltoidea (= P. monilifera).*
25	*Caragana arborescens*, Siberian Pea Tree.	200	" *nigra pyramidalis*, Lombardy Poplar.
25	*Catalpa Kempferi*, Japanese Catalpa.	500	*Prunus spinosa*, Black Thorn.
25	" *cordifolia*, Western Catalpa.	50	*Ptelea trifoliata*, Wafer Ash.
10	*Chionanthus virginica*, Fringe Tree.	100	*Pyrus aucuparia* Eur. Mountain Ash.
100	*Clematis Vitalba*, Traveller's Joy.	100	*Rhamnus catharticus*, Common Buckthorn.
25	*Cornus alba sibirica*, Siberian Dogwood.	100	" *frangula*, Alder Buckthorn.
10	" " *variegata*, Variegated Siberian Dogwood.	25	*Rhus cotinus*, Smoke Tree.
		50	Roses, Hybrid perpetuals, 10 varieties.
25	*Crataegus Oxyacantha*, English Hawthorn.	200	*Salix argentea*, Silver Willow.
10	" " *fl. rosea plena*, Double red-flowering English Hawthorn	200	" *laurina*, Laurel-leaved Willow.
		10	*Sambucus nigra aurea nova*, Golden Elder.
25	" *pyracantha.*	25	*Spiræa arguta.*
25	*Deutzia crenata*, Crenate Deutzia.	10	" *Japonica Bumalda*, Anthony Waterer
25	*Diervilla (Weigelia) florida.*	25	" *prunifolia.*
25	" *rosea.*	25	" *Van Houttei.*
10	*Elæagnus multiflora.*	10	*Syringa Japonica*, Japan Lilac.
625	*Euonymus Japonicus*, Japan Euonymus.	25	" *Josikaea*, Josika's Lilac.
25	*Forsythia suspensa*, Golden Bell.	25	" *chinensis*, Rouen Lilac.
500	*Fraxinus excelsior*, European Ash.	10	" *vulgaris*, Chas. Xth.
1,000	*Genista sagittalis = (G. Scoparia).*	10	" " *alba*, White Lilac.
2,000	*Gleditschia triacanthos*, Honey Locust.	25	" " de Marly.
10	*Halesia tetraptera*, Silver-bell Tree.	25	" " 6 named varieties.
200	*Hippophæ rhamnoides*, Sea Buckthorn.	500	*Ulmus americana*, American Elm.
25	*Hydrangea paniculata grandiflora*, Japanese Hydrangea.	25	*Viburnum Lantana*, Wayfaring Tree.
		25	" *Opulus sterilis*, Snowball.
500	*Juglans nigra*, Black Walnut.	10	*Wistaria magnifica.*
500	*Ligustrum amurense*, Amur Privet.		The following fruitbushes were included in this order :—
25	*Lonicera Belgica*, Belgian Honeysuckle.		
25	" *sempervirens*, Scarlet Trumpet Honeysuckle.	50	Currants, White Dutch.
		25	" Black, Lees Prolific.
25	" *tatarica grandiflora rubra*, Tartarian Honeysuckle.	25	Gooseberries in 4 varieties. This order also included 50 lbs. of the seed of the Maritime Pine, *Pinus pinaster*.
500	*Lycium Europeum*, Matrimony Vine.		

TREES, ETC., SENT FROM OTTAWA.

Some further material for planting was also taken from Ottawa. This included 1,000 cuttings of *Salix longifolia*, a willow with creeping roots, which grows luxuriantly on the banks of the Saskatchewan river at the Experimental Farm at Brandon. This willow promises to be a good soil binder. As supplementary to the supply of fruits, there were also the following:—

101 Currant bushes, red, white and black, in 23 varieties.
28 Gooseberries, in 5 varieties.
39 Raspberries, in 3 varieties.
254 Strawberries, in 12 varieties.
23 Dwarf June berry.
19 Sand Cherry.
13 Beach plums.
75 Pyrus baccata.
48 Pyrus prunifolia,

Also 6 *Eleagnus argentea* (Wolf willow), a small collection of rhubarb roots, a number of varieties of perennial flowering plants, and an assortment of seeds of trees, shrubs and plants of the hardiest sorts.

THE EXPEDITION STARTED.

As soon as the shipment of trees from Normandy had reached Halifax preparations were made for our departure. The party comprising the expedition was Lieut.-Col. F. F. Gourdeau, Deputy Minister Marine and Fisheries, Mr. W. E. Saunders, of London, Ont., Mr. Thomas Davies, of Ottawa, and myself. We arrived in Halifax on May 14 at 10 p.m., where we were met by Commander Spain, in charge of the government steamers, who informed us that the steamer *Minto* was in waiting with steam up and that everything was ready for an immediate start for Sable Island if we wished to go at once. After consultation we found this was not quite practicable, so we went on board and rested until morning. The obtaining of some additional supplies occupied the next morning, and it was 2 p.m. before the steamer left. When we got well out to sea we found a rather heavy swell, and as evening approached the captain decided that we could not reach the island that night so we headed for Liscombe harbour, which is about the nearest point on the mainland to Sable Island where we arrived about 9 p.m., finding there smooth water and good anchorage. About 4 a.m. the anchor was weighed and the steamer followed a direct course to the island. The sea was fairly heavy, but we made good progress, sighted the island at 10.30 a.m. and anchored at 11.30, about a mile from the shore, which is as near as large vessels can safely come owing to dangerous sand bars which extend in several directions from the land.

ARRIVAL AT THE ISLAND.

As soon as the steamer was sighted signals were run up from the look-out point on shore, and one of the large surfboats was soon got out and manned and on its way to the ship. The Superintendent of the island, Mr. R. J. Boutellier, came in this boat and extended a cordial welcome to us to the island. A load of supplies with the baggage of the party was first landed, and the next trip we were all taken ashore. On the way to land we were several times surrounded by shoals of large cod-fish which were sporting about and jumping out of the water in a very vigorous way. We also met a number of seals near the shore, which poking their heads above water eyed us with great curiosity, while hundreds of terns were flying just overhead making very discordant screams. As there is no harbour, wharf or sheltered landing place on any part of the island the only way of reaching the shore is to ride in on the crest of the breakers. In this way the visitors reached within a few yards of the island when they were carried to dry land on the shoulders of some of the sturdy officials who trod the water as if it might have been their native element. As the sea was comparatively calm there was but little difficulty experienced in getting ashore.

INTERESTING SCENES.

On landing the scene was one of great novelty and interest. The island is a singular formation, the larger part consisting of bluffs and rolling hills of white sand varying in height from 20 to 100 feet, much of which is partly held together by the roots of a sand-binding grass *Ammophila arenaria,* while considerable areas are covered with loose sand which is blown about by the strong winds which prevail there, hence the configuration of the surface is ever changing. Near our landing place was the boathouse which has been built in a large gully which has been formed by the tearing away of a high sand cliff by the wind. Near the west side of the gully stood a pyramid of sand which had originally been a part of a continuous cliff running from east to west. The gully had apparently been worked out in two parts, and when the excavation was complete this pyramid was left standing between the two, a perfect cone from 30 to 40 feet in height. Passing up through this gully we got our first view of the interior of the island. From the hill tops on the north side the land sloped away

southward in a very irregular undulating manner until it almost reached the level of the ocean. Before us lay the Superintendent's house, painted white, with an acre or two of timothy and clover in front of it which was as green as a pasture field on the main land. Beyond the house lay the large inland lake of salt water which occupies so large a part of the interior of the island. Beyond that was the south bar built up of varying heights by the shifting sand, and outside this the ever rolling breakers of the turbulent ocean.

UNPACKING AND HEELING IN THE TREES.

We were soon comfortably lodged with the Superintendent's hospitable family, where we were to spend a busy week, and the remainder of the afternoon and evening was spent in looking over the ground to find a suitable location where we could unpack and heel in our precious cargo of trees. In the meantime the Superintendent had manned another surfboat, and by dint of much hard rowing our 18 large cases of trees, together with the stores brought for the island were all landed on the beach before night fall. The side of the sand gorge on the way up from the boat-house was chosen as a suitable and convenient place for the heeling in of the trees, and early next morning two sturdy yoke of oxen were engaged in hauling the ponderous boxes from the sea shore to this spot. By 7 a.m. all available hands were at work at the trees, some opening and unpacking the cases, others digging trenches in the moist sand in which the young trees were placed and the roots well covered. By the time evening came 16 of the 18 boxes were unpacked, and the remaining two were finished on Saturday morning. The young trees came out in very good condition. They had been six weeks packed, a little mould was occasionally found on some of the roots and stems and a few of the evergreens were partly decayed, but the injured specimens formed a very small proportion of the shipment. The trees had been skilfully packed so as to admit air to all parts of the interior, and the great bulk of the material was quite green and fresh looking. The early part of Friday was fine and bright, but cool, later in the day there was a little rain and towards evening it was quite windy.

STARTING THE FIRST PLANTATION.

On Saturday the 18th, after finishing the unpacking of the two remaining cases of trees and the boxes of fruit bushes, &c., which were brought from Ottawa, the first plantation of trees on the island was started on the upper part of a sandy bluff near the north shore, and north-east of the look-out station. This was fairly well covered with the sand binding grass *Ammophila arenaria,* and was partly protected by a ridge all around, leaving the part chosen for planting in the form of a shallow basin. In this plantation the trees were put from 2½ to 3 feet apart each way among the grass without any preparation of the land. The planting was begun just under the ridge on the south side, and was done as follows:—A spade was pressed down to its full depth in the sand, and pressed backwards and forwards several times until an opening had been made, when the spade was withdrawn and the young tree inserted so as to have its roots well underground when the sand was pressed against the tree firmly with the foot. In planting two men worked together, one used the spade and the other inserted the trees and pressed the sand firmly about the roots with his foot. Before the day closed a large number had been thus planted. The soil at this point seemed to consist wholly of pure sand, no humus could be detected in it.

CHURCH SERVICE ON SUNDAY.

On Sunday morning a church service was conducted by the Superintendent of the island, Mr. Boutellier, who read the service of the Anglican Church and a short sermon

afterwards. There were 14 or 15 present, and all joined heartily in the singing. The musical part of the service was greatly aided by the piano played by Mrs. Boutellier, and a violin played by her son. The service was interesting and impressive. The congregation were summoned by a bell mounted outside the building which had been got from a wrecked vessel. A good deal of the furniture in the dwellings on the island consists of articles rescued from similar disasters; indeed one finds reminders on all hands of wrecks.

LOOKING OVER THE GROUND.

In the afternoon a walk of several miles was taken along the shores of the lagoon, and some promising sites for other tree plantations examined. During this ramble a considerable area of ground was found which was covered with 3 or 4 inches of black peaty soil mixed with sand and with pure sand underneath. On this land the common juniper was growing, also masses of crowberry, *Empetrum nigrum* and quantities of wax myrtle (*Myrica cerifera*), blueberry (*Vaccinium*), wild rose and other plants. Doubtless this dark peaty layer has been formed from the gradual decay of many successive crops of these plants and shrubs. The weather was more or less foggy during the greater part of the day, clearing up at intervals, with a strong wind from the north which worked up a very stormy sea and the breakers were so powerful that it would not have been practicable to have gone out to a ship in such weather.

ADDITIONAL PLANTATIONS BEGUN.

On Monday morning, May 20, we were all early at work at the trees with the available force so divided that planting was carried on during the day at three different points. The weather was foggy, windy and cold, but plenty of exercise induced warmth. A plantation of trees was put out in front of the Superintendent's house, another on the east side, and a third was put in the Superintendent's garden. In the latter enclosure, which was a good sized piece of ground, all the small fruits were planted, all the smaller lots of shrubs and trees and 10 or 12 each of all the other varieties. Hence in that plantation specimens of all the different sorts under trial are ranged side by side under similar conditions. The garden plot, originally sandy, had with the frequent application of manure from the barn and stables become somewhat loamy, so much so as to grow vegetables fairly well. In such soil many of the trees and shrubs are likely to do well. The plantation in front of the Superintendent's house is nearly pure sand, that on the side has a little loamy material in it, and another at the back of the house is of the same quality. As the result of this day's work several thousand trees were placed.

EVENING SEARCH FOR TERN'S EGGS.

Towards evening three of us went across Lake Wallace in a boat to the south side for tern's eggs, as we found them very good eating. On landing we found the eggs quite plentiful. There were thousands of the birds flying around screaming and swooping down towards us in a most threatening manner. Their nest is simply a little hollow place worked out in the sand with sometimes a few bits of sea-weed in it, usually eel grass, but this is exceptional. In these nests which were scattered all over the surface, and more numerous on elevated knolls, we found from one to three eggs. In a short time our party gathered over twelve dozen. In most nests there was only one egg, in from ten to twenty instances two eggs, and in one nest only, three eggs. There would doubtless have been more eggs in some of the nests, as three is the usual number these birds lay, but for the fact that they had been gathered on that part of the shore two days before when we had a large supply for breakfast.

HOW COOKED AND SERVED.

In cooking these eggs they are usually fried. A large number are broken and put into an open dish where the little round bright coloured yolks looked quite pretty in their transparent surroundings. When a sufficient number are ready they are turned into a frying pan and cooked—without breaking the yolks—until the mass is quite firm. It is then turned out on a plate, cut in pieces and served. A slice cut through the mass looks quite attractive, and with the hunger which comes with plenty of exercise in a very invigorating atmosphere they seemed delicious. There was no lack of appetite however with any of our party, and we were always ready for our meals.

A JOURNEY THROUGH THE ISLAND.

As our steamer was to come for us on Thursday it was decided to devote Tuesday to an excursion down the island, 15 miles to the East Light. We had breakfast at 6.30 a.m., and started at 7 o'clock sharp. Three of the party rode on ponies and the others in vehicles. The morning was foggy, but the fog soon lifted, and we had a lovely bright day. On our way we found a very suitable spot for a large tree plantation, about 1½ miles east of the main station, a large undulating depression with protecting ridges all around, and covered with peaty soil three or four inches deep. There a large quantity of trees were subsequently planted, and the grove is now known as Gourdeau Park. This drive was a most interesting one and revealed to us all the main characteristics of scenery on the island. It was evident at many points that during the strong gales the wind played havoc with the loose sand, often materially changing the contour of the surface in a single season. Drifts had occurred in some places so deep as to bury the telephone poles, in others their bases would be blown bare. On our way we passed a building which had just been fitted up for a school. This is a new thing for the island.

POPULATION OF THE ISLAND.

The entire population distributed about and between the two lighthouses, which are about 18 miles apart, number 45. There are 18 men, six of whom are married, and their wives and children make up the remaining number. The number of children needing school privileges is from 10 to 12, and hitherto they have had no means of education, excepting what they could get in their homes. An arrangement has now been made for a teacher and the children who do not live within walking distance will come to the school on Monday morning and return home on Friday evening, boarding in the school house and occupying dormitories there at night. This school will be a great boon to the people.

ORGANIZATION OF THE LIFE-SAVING SERVICE.

The men on the island are divided into small groups so arranged at different points as to admit of the inspection of every part of the shore of the island twice each day. All the stations are connected by telephone with the Superintendent's residence, and reports are made to him morning and evening by each station. At the main station there are five men who take the inspection of the coast alternately for 10 miles—five miles on either side. The west end lighthouse men take charge of about six miles. The men at No. 3 station, which is nine miles east of the main station, inspect 10 miles of coast line. Those at No. 4, which is 14 miles distant, inspect 12 miles in the morning and 24 miles in the evening, and the men at the east end lighthouse have the inspection of 12 miles of coast line in the morning and none in the evening.

In this way provision is made for a careful inspection of every part of the shores of the island twice each day. When the day is clear, inspection can be made with glasses from certain look-out points, but in foggy weather, which is very common, the whole distance must be travelled over and the result telephoned to the Superintendent. Island ponies are used in travelling. In case a vessel is seen flying signals of distress this is reported at once to the Superintendent, who gives prompt instructions as to what is to be done and proceeds with all speed to the scene of action. There are three life-saving stations, the central one, No. 3, and No. 4, where life boats and other life-saving appliances are kept, and a life-saving crew can be assembled at either of these stations in about half an hour.

RECENT HARDSHIPS OF FISHERMEN.

The fishing for cod on the banks is usually done in small boats with two men in each, and each fishing schooner is supplied with several of these boats. In foggy weather the men sometimes lose sight of their ships and drifting to sea are lost. A few days before we arrived two boats had drifted to the island, each containing two French fishermen; one boat had been out for five days, the other for two days, and during this time the men after the first day had nothing to eat but raw fish. The men who were five days out reached the shore of Sable Island in a very exhausted condition, scarcely able to crawl. Another boat also with two men had for a time been in company with one of the two boats saved, but after the first day they parted. Nine days later this boat drifted to the island shore bottom upwards. There are generally more or less cases of this sort every year.

Substantial wooden buildings have been erected by the Government at different points to serve as shelters for shipwrecked people which are fitted up with beds and sleeping berths and provided with bedding. Sufficient stores of food are also kept on the island to feed for some time a considerable number of people so that there may be enough for the crew and passengers of any ship which may be so unfortunate as to be wrecked here.

The remains of many wrecks were seen during this drive, the most prominent of which was the *Crofton Hall,* a good sized iron vessel, which was wrecked some three or four years ago and still remains unbroken, embedded in the sand on the bar at the eastern extremity of the island. We visited station No. 4, where some additional sites for tree planting were selected, we examined the life-saving appliances there and visited also the eastern lighthouse.

On the return journey we drove along the north beach for some miles, here seals were very abundant in large bands, of about 50 to 200, lying on the shore enjoying the warmth of the sun. As we approached the members of the flock would raise their heads in alarm and wobbling along in their own jerky way with a sort of undulating movement they soon reached the water. Their style of moving on land was very ludicrous. Sometimes the young seals which cannot travel fast are left behind and may then be easily caught. After a very pleasant and most interesting drive we reached the main station a little before sundown.

REACHING THE END OF OUR VISIT.

Wednesday was our last working day, the weather was bright and tree planting was pushed along rapidly, and by the close of this day we had succeeded in planting in all about 10,000 trees, leaving 71,000 still for the Superintendent and his men to plant before the work would be completed.

On Thursday morning there was a dense fog, the work done was reviewed and full instructions left with the Superintendent in reference to the completion of the planting. About 10.30 the fog lifted when our steamer was seen about a mile from the

shore awaiting our arrival. We had, on the whole, favourable weather. The temperature had varied during the week spent on the island from 38 to 57—the latter being our hottest day. We bade our hospitable friends farewell with much regret as our stay had been most enjoyable. The surf boat was got out, but the sea was heavy, and it was no easy matter forcing it through the breakers. Many attempts were made and the boat thrown back repeatedly on its side before the resistance of the water could be overcome. Eventually it was pushed through and started on its first trip with the baggage and part of the passengers. In the course of 30 or 40 minutes the boat returned.

THE DEPARTURE.

After much struggling with the breakers the boat was finally got into position again, and on the word of command being given the passengers and boatmen jumped quickly in and with a united effort on the part of the crew and their assistants on shore the boat was started. With a hearty pull she mounted the first breaking line of surf and was fairly afloat. At first she dipped high and low as we passed through the several lines of breakers, but in a few moments more she was fairly clear of these, and we were then rocked in the swell of the ocean. The getting off was exciting and we were tossed about considerably before we reached the side of the steamer where the passengers climbed up in turn the companion gangway and were soon safe on board.

We now bade our host, the excellent and capable Superintendent of the Island, farewell, giving our parting injunctions concerning the trees, the surf boat went off and we started for Halifax. The sea was very rough, and the steamer pitched and rolled continuously during the afternoon and through the night, but we landed safely at Halifax on Friday morning at 6.30.

SAMPLES OF SOIL FOR ANALYSIS.

I brought with me a sample of the almost pure sand forming the soil on the top of the sandy bluff on which the first plantation was made in which the sand binding grass was growing, also two samples of the black peaty layer which covers the sand to a depth of 3 to 4 inches over a large portion of the central part of the island, probably to the extent of 1,800 to 2,000 acres. One of these was taken from the large area chosen for the plantation to be known as Gourdeau Park, and the other was from similar soil some miles further east. I also brought a sample of similar material picked up on the beach on the south shore where it was being washed by the sea. A fifth sample consisted of a bunch of the sand-binding grass *Ammophila arenaria.* These were submitted to the Chemist of the Experimental Farms, Mr. F. T. Shutt, for analysis, who reports on them as follows:—

'ANALYSIS AND REPORT ON SAMPLES FROM SABLE ISLAND.

By Frank T. Shutt, Chemist, Dominion Experimental Farms.

'No. 1. Sample of the sand from field on top of the bluff, north-east of the look-out, where first forest clump was planted. It contains roots of grass *Ammophila arenaria.* Weight of sand, 2 pounds 13 ounces, containing $\frac{3}{4}$ ounces of grass roots.

'Analysis of this sand after separation of the greater part of the fibre showed ·0018 per cent of nitrogen.

Digestion of this sand with hydrochloric acid (sp. gr. 1·115) at the temperature of boiling water for 5 hours, showed that ·412 per cent had passed into solution.

The examination of this acid solution gave the following data :—

Oxide of iron and alumina	·328
Lime	·062
Phosphoric acid	·012

Potash :—By the spectroscope, traces of potash were plainly discernable. With the usual reagent (platinic chloride) only a very faint precipitation was obtained when working on an acid solution from 10 grams of the sand.

'No. 2. Sample of peaty soil from surface underlaid by sand in central part of island 1½ miles east of residence of Superintendent where a large block of trees has been planted, locality known as Gourdeau Park, layer 3 to 4 inches thick.

'Analysis of (air-dried) peaty soil:—

	p. c.
'Moisture	4·87
'Organic matter	22·22
'Mineral matter practically sand	72·91
	100
'Nitrogen in organic matter	·878

'No. 3. Representative sample of peaty soil covering a large area some distance east of where No. 2 was taken, from 3 to 4 inches deep, and underlaid by sand. Weight soil, air-dried, 3 pounds 12½ ounces, containing 5½ ounces fibre.

'Analysis of (air-dried) peaty soil:—

	p. c.
'Moisture	1·48
'Organic matter	8·63
'Mineral matter practically sand	89·89
	100
'Nitrogen in organic matter	·271

'No. 4. Sample from a large lump of peaty soil found on the beach on the south shore, being washed by the sea. It contains a considerable amount of semi-decayed eel grass *Zostera maritima*. Weight of soil, air-dried, 1 pound 5 ounces, containing 2½ ounces fibre, principally eel grass.

'Analysis of (air-dried) peaty soil:—

	p. c.
'Moisture	3·00
'Organic matter	9·50
'Mineral matter practically sand	87·50
	100
'Nitrogen in organic matter	·267

'The above three samples are similar in character, and no doubt also as to origin. They may be considered as semi-decayed vegetable matter (largely fibrous) and sand, and practically the only point of difference between them lies in the varying proportions of these two constituents. In the air-dried condition the sand can be very easily separated from the organic matter by shaking and sifting, showing that there is no intimate incorporation of these constituents as in the case of true soils.

'The plant food they contain other than nitrogen is present in very small amounts, and we must suppose exists in such a condition that it is only slowly set free for plant use.

'No. 5. Analysis of the (air-dried) grass or hay *Ammophila arenaria* from Sable Island, chiefly barren stems :—

	p. c.
Moisture	12·42
Protein	13·81
Fat	·81
Fibre	41·00
Carbo-hydrates	26·71
Ash	5·25
	100

'In protein or albuminoids this grass makes a very good showing, being quite equal in respect to these important nutrients to many of our highly esteemed cultivated grasses.

'The percentage of fibre is above the average, and this together with the somewhat high protein, necessarily makes the carbo-hydrates (starch, sugar, &c.) much lower than usual. This hay contains 5·25 per cent ash or mineral matter, which on further examination is found to include 1·37 per cent of sand. This sand had remained attached to the grass in spite all care being taken to separate it.

'The indications are that though probably somewhat less digestible than the best hays made from grass cut before seeding, this Sable Island grass has a distinct and even moderately high feeding value due to its comparatively speaking large protein content.'

The results obtained by Mr. Shutt are very interesting and valuable. The ponies, of which there are four bands numbering about 120 in all running wild on the island, feed almost entirely on this grass which looks tough and hard and does not impress one as likely to be very nutritious. The ponies, however, do well on it, and even the domestic cattle use it considerably, although they are said to prefer timothy and clover. The fact that this grass has a decided nutritive character is now demonstrated.

ARRANGEMENTS FOR THE USE OF ARTIFICIAL FERTILIZERS.

Realizing at the outset that it was probable that the soil of some of the sites which might be chosen for tree planting on the island would be deficient in the elements of fertility needed for the healthy growth of trees, a sufficient quantity of artificial fertilizers was taken to Sable Island with the trees. These included nitrate of soda, muriate of potash, superphosphate of lime with a few barrels of quick lime. Instructions were left with the Superintendent as to the use of these after the trees were planted, and the proportions in which they should be mixed. That after mixing they should be diluted with an equal bulk of sand and scattered in small proportion over the ground once a month for three months, leaving a small portion of each plantation untreated for comparison. This would probably give the trees at the start sufficient plant food for healthy growth.

A NATURAL SOURCE OF PLANT FOOD.

There is one source of plant food on Sable Island which should not be overlooked. Sea birds are most abundant there. After travelling over the greater part of the island and seeing the immense number of terns everywhere, from a rough computation of the number per acre and the acreage of the island we estimated that these birds alone did not fall far short of a million on the island. They feed on small fish, and they are so incessantly active that they consume large quantities and their droppings are seen on every hand. This perennial source of fertility must have its effect. Like the guano

on the sea-girt islands in parts of South America this material is very rich in plant food, which is in readily soluble forms and the quantity deposited every year would probably be sufficient to supply a considerable part of the small proportion of these elements needed for healthy tree growth. Traces only of these useful elements are found in the clear, pure sand which covers so large a part of the surface of the island, probably for the reason that this fertilizing material if not promptly taken up by plant roots is so soluble that it is soon washed through the porous sand by frequent rains and its accumulation is thus prevented.

CONDITIONS OF CLIMATE—STRONG WINDS.

The climate is a very singular one, and one of the chief difficulties in the way of rapid success in tree planting is the force and constancy of the winds, and the frequency of the gales. From the meteorological tables here given, prepared by Mr. W. T. Ellis from material kindly furnished by Mr. R. F. Stupart, Director of the Meteorological Service of Canada, covering nearly four years, it appears that the average hourly velocity of the wind during the whole of that period has been more than 18 miles, while the gales have averaged over 10 each month when the winds have ranged mostly from 40 to 65 miles an hour. A study of the temperatures will show that there are no extremes of heat or cold on the island; that the highest temperature during the past four years has been 78, and the lowest point reached by the thermometer during the same period was 5 above zero.

Months.	Maximum.	Minimum.	Total Precipitation.	Average hourly velocity of wind.	Maximum velocity.	Number of gales.	Fair.	Fog.
1898.	°	°	Inches.	Miles.		Days.	Days.	Days.
January	48·5	6·0	5·65	21·5	48	18	15	2
February	43·0	17·0	1·54	18·7	64	14	20	2
March	46·5	23·5	3·20	17·8	46	17	20	9
April	53·0	27·0	4·90	19·8	38	18	16	10
May	60·5	33·0	2·90	15·7	41	7	24	8
June	66·0	39·0	3·12	15·9	39	9	20	14
July	75·0	45·5	4·55	11·8	25	1	17	10
August	77·0	58·0	4·44	12 0	27	2	18	17
September	73·5	46·0	5.89	16·6	42	9	19	7
October	61·5	39·5	3·85	18·6	36	13	20	6
November	63·0	30·0	8·68	19·6	49	18	16	9
December	52·0	18·0	6·64	23·7	59	20	16	6
Averages	59·95	31·87	4·61	17·6	42·8	12	18	8
1899.								
January	48 5	7 5	2·17	24·4	53	21	19	3
February	39·0	9·0	2·78	26·0	65	19	17	6
March	47·5	17·0	4·96	22·6	46	20	22	13
April	48·0	29·0	1 65	19·5	56	13	22	12
May	59·0	28·0	2·62	18·2	39	10	21	7
June	64·5	41·0	4·97	12·8	27	3	16	11
July	71·0	52·0	2·30	14·9	31	5	22	·21
August	74·5	56·0	3·76	12·6	32	2	20	2
September	72·0	48·0	3 52	16·0	40	7	20	8
October	69·0	44·0	5·71	16·8	46	9	22	6
November	59·5	32·0	2·66	20·0	56	12	18	8
December	53·0	24·0	4·31	18·8	49	18	17	6
Averages	58·79	32·29	3·45	18·5	45	12	19	8

Months.	Maximum.	Minimum.	Total Precipitation.	Average hourly velocity of wind.	Maximum velocity.	Number of gales.	Fair.	Fog.
1900.	°	°	Inches.	Miles.		Days.	Days.	Days.
January	52·5	17·0	5·76	23·7	56	20	14	5
February	52·0	7·0	3·59	26·5	56	20	17	3
March	48·5	15·5	6·15	22·2	52	19	16	8
April	52·5	32·5	5·55	19·4	46	16	14	6
May	57·8	34·0	3·04	16·2	37	6	19	7
June	69·0	40·0	2·84	14·2	27	6	21	14
July	75·0	49·0	2·25	13·4	32	3	23	18
August	73·0	51·0	6·16	13·6	40	4	17	6
September	70·0	47·0	5·66	16·2	49	7	17	8
October	66·0	37·0	2·31	17·4	51	11	21	5
November	60·5	27·0	2·94	22·7	46	24	11	8
December	49·0	20·0	2·94	21·8	52	15	14	3
Averages	60·48	31·41	4·09	18·9	45	12	17	7
1901.								
January	47·0	5·0	3·24	22·7	58	14	19	9
February	45·5	19·0	3·21	21·9	45	9	12	4
March	47·0	19·0	4·04	20·2	56	12	23	11
April	54·0	34·0	2·36	19·4	60	4	24	17
May	57·0	34.0	4·97	13·3	34	1	18	10
June	63·0	44·0	2·38	14·8	36	1	24	15
July	77·0	53·0	2·90	12·9	36	0	28	19
August	78·0	60·0	3·36	11·3	34	1	26	13
September	76·5	48·0	1·65	17·4	42	5	26	7
October	68·0	41·0	4·52	18·4	48	4	25	9
November	57·5	30·0	2·10	18·2	62	7	23	0
December	....	....	....	....	.....	....	.....	.....
Averages	60·95	35·18	3·17	17·3	46	5	22	10

PROGRESS OF THE WORK.

Letters have been received from the Superintendent every time an opportunity has occurred of sending one. As a rule the only communication the island has with the outside world is when a supply boat visits them, which is seldom more than three or four times a year. We left the island on the 23rd of May, and the first letter received bears date of 17th June, written in anticipation of the visit of the steamer as it did not reach me until July 12. Mr. Boutellier says: 'I feel that I can write to you now and give you all the particulars as to the planting, as we put in the last of the trees to-day at 4.30 p.m. There are about 200 to 300 planted at east end light, about 3,000 at No. 4 station, 1,000 at No. 2, and about 5,000 at No. 3 station, the balance were planted in what I have named Gourdeau Park. I managed to plough about nineteen-twentieths of the ground in this park, and there was about three inches of the black mould all over, and I was surprised at the even thickness of it as it varied very little in that respect. The pine and maple seed I also put in there to-day in ploughed ground, and then run a harrow over it lightly. I expect to have this ground all fenced before the end of the week with the wire and posts you brought over.

'I may say that almost everything planted seems to have taken root, those you first put in are budding freely, although I regret to say that on Friday last we had a moderate gale which lasted about 24 hours when the wind at times exceeded 40 miles an hour. I find that on the trees with soft leaves which had just opened, they were burned off as if from frost. The pines and spruces were not affected as far as could

be observed. For a week after I began the park plantation it was wet and foggy every day, and on the 2nd of June we had a wreck. The *Stella Maris*, of Granville, France, on the N.E. bar, our life boat went out but before we could reach the vessel the crew had abandoned the wreck and taken their own boats in which they came ashore. This was a temporary set back to the planting, but I employed three of the crew to help us, or I should not have finished the planting so soon. I am glad to have got them all in before the dry weather of July. I think it has been a favourable time, as we have had frequent and some heavy rains. Tree growing grows on one, and I hope that in the near future Gourdeau Park will be one of our show places. You can understand what interest I took in it when I ploughed over ten pounds of superfluous flesh off, and had a crick in the back several nights.'

SECOND REPORT.

The next letter was written on July 29, 1901, but in the interval Col. W. P. Anderson, Chief Engineer and General Supt. of Lighthouses, paid a visit to the island and took notes on the condition of the trees, and on his return to Ottawa kindly gave me an account of what he had seen and reported very favourably as to the general condition of the plantations. In Mr. Boutellier's letters, he says: 'Nearly a month has elapsed since Col. Anderson's visit, and yesterday I visited the plantations. I cannot give you close detail as to the many varieties, but can give you a general idea of the whole lot, and those that call for special mention. All the pines are growing, excepting a few. The white pine *P. strobus* can't stand the wind, but when sheltered grows freely. While the birches have leaved, they are feeble. Common juniper is a failure; Virginian juniper good. Maples, willows are growing and seem to do as well in the large plantations as in the nursery in the garden inclosure. Arbor vitae good. To generalize, I think the plantation at Gourdeau Park looks as well as the most practical enthusiast could expect. The small plantations at the other stations are doing about the same.

'The 50 lbs. of seed of maritime pine planted is up as thick as it can stand, and looks very fine and strong; they are standing the last few weeks well, which have been warm and dry. A few of the Manitoba maples are also up about two inches above the ground.

'In the garden plot there are some disappointments among the small lots. All the specimens of the following have died: *Betula alba laciniata,* four lots of honeysuckle, *Spiraea, Anthony Waterer ; Lilac Michael Buchner ; Retinospora filifera, Cornus sibirica variegata, Halesia tetraptera, Juniperus communis* and Cuthbert raspberry ; of some others a portion have died, but samples of each are left.

'The following are doing well and making good growth: Beach plum, *Pyrus prunifolia,* many of the currants and gooseberries, Golden Queen raspberry, blackberries, strawberries, roses, Siberian crab, *Acer platanoides, Ampelopsis quinquefolia, Berberis purpurea, Deutzia crenata, Bignonia grandiflora, Retinospora plumosa,* Hovey's arbor-vitæ, Columbian arbor-vitæ, also *Elwangeriana* and *Globosa, Amur privet, Euonymus Japonica* and *Lycium Europeum.* Of this I feel quite satisfied that if only one variety grows and succeeds nearly all the others may be grown under the shade or protection of that one. Shelter seems to be the desideratum. One dressing of the mixed fertilizers has been given, but it is too soon to expect results.'

THIRD LETTER.

The last communication was written on November 5. The Superintendent says : 'With regard to the condition of the trees the latter part of the summer was very dry, so much so that our vegetables are less than a half crop, so that you can see it must have been trying for the trees.

Rainfall—

June, 2·38 inches; spread well over the whole month; fogs as well.
July, 2·90 inches; spread well over the whole month; fair; warmer.
August 1 to 13, 3·36 inches; no fogs; very warm.
September 8 to 30, 1·65 inches; no fogs; very warm; dry gales.
October 3 to 24, 3·60 inches; no fogs; warm; some high winds.

'You will see from this that the trying time was from August 13 to October 3, with only 1·65 of rain, no fogs and very warm weather for Sable Island. The thermometer averaged high all summer.

'This drought killed most of the weaklings, and the high winds burned the leaves off the deciduous trees between September 21 and 26, during which time it blew a continuous gale from S.W. around to north. After the gale subsided, the leaves were as though a fire had run close to the trees and scorched them. It was not cold, and we have had no frost yet.

'Many of these trees were very promising, and some of them are budding again since we have had rains. We have had a fair amount of blooms from the roses which were much appreciated. We also had a sample of the strawberries. Many of the varieties made good growth, but we shall be able to judge better as to their permanent hardiness here next July.'

'Now, as I think I have shown you the worst side, I will show the other. All the evergreens looked dull during the drought, but after we had a few rains they improved wonderfully. All the pines, except the white pine *P. strobus* are looking splendidly and have made growth. The plants from the pine seed also grew well, but lately I noticed that many were turning a bluish cast. Some spruces survive, but few look promising. Arbor-vitæ suffered much from drought, but there are many promising specimens in various localities.'

'This general statement of the conditions of the trees applies to all planted in the various localities, but I think Gourdeau Park, 1½ miles east of main station, is most promising, and next is 4th station plot. In all plots planted the weeds and grass has grown freely, and I am satisfied now that this is best for the trees; it gives shelter. If the ground had been kept clear the drifting sand would abrade the bark, and it is very noticeable that trees do best where sheltered by grass or wild plants. In 'Gourdeau Park' there is shelter owing to the conformation of the ground, and the slopes have different exposures. I find where the slopes are exposed to the south-west and west winds (our prevailing winds) the trees are least promising.'

The experience thus far had covers too brief a period to permit of the forming of any decided opinion as to the ultimate success of this experiment in tree planting on Sable Island. It does, however, seem to me notwithstanding the unfavourable conditions that the outlook is promising. The work is most interesting and the outcome of it will be carefully watched and the results obtained recorded from time to time in our reports.

AGRICULTURAL AND HORTICULTURAL DISPLAYS AT THE GLASGOW EXHIBITION.

The immense resources of Canada as a food producing country and the important position which agriculture occupies here are not yet very well known in Great Britain, and one of the objects in view in the exhibit made in Glasgow was to bring before the visitors some practical evidences of these remarkable agricultural resources and of the great progress made in recent years towards their development. With the very large variety and abundance of material available at the Experimental Farms, the assistance of the Departments of Agriculture of the provinces and the kind co-operation of lead-

ing farmers in different parts of the Dominion there was brought together in the Canadian pavilion at Glasgow one of the finest collections of cereals ever made.

By instruction of the Hon. Minister of Agriculture, Mr. W. H. Hay, accountant of the Experimental Farms, was sent to Glasgow to put this material in place. His long experience with exhibitions in this country and the ability and artistic taste he has shown from time to time in the arrangement of the products of the Experimental Farms at exhibitions at home led to his being chosen to do similar work at the Paris Exposition in 1900. There he arranged an exhibit which was very much admired, but his work in Glasgow seems to have been an unusual triumph.

THE CANADIAN AGRICULTURAL TROPHY.

Mr. Hay in his report, says: 'The agricultural products were shown in the form of an immense trophy, situated in the centre of the building, which was erected in the form of an octagon with a circumference of 65 feet, and rose to a height of 35 feet. In front of four of the arches were placed open stands or shelving, and on these were displayed the threshed grain in bottles of many sizes and shapes. Each sample was carefully labelled with the name of the variety, and as far as practicable the place of origin and the yield per acre was given. The placing of the bottles in the arches permitted of their being seen to advantage and examined from all sides. The other four arches were left open and used as passage ways. The spaces between the arches were built up with pillars of grain forming an open square with a glass cylinder of grain in the centre.

'On the outside the lower part of the trophy was decorated with sheaves of grain and hundreds of bunches of grain and grasses. Higher up the grain was massed and arranged in gothic arches and in circles, and when completed the structure had the appearance of an immense temple of cereals. Coats of arms of the provinces were placed over each of the main arches, and some fine specimens of mounted "prairie chickens" were distributed among the sheaves of grain.

'In the centre of the trophy was a circular settee for the convenience of visitors who desired to rest, and above this was a glass case in which was shown samples of wool, flax, hops and leaf tobacco. From the ceiling of the trophy was suspended bunches of Indian corn in the ear, leaf tobacco and flax. Several large open urns with a capacity of about two bushels each were placed on convenient stands, and filled with choice red fife wheat. The desire for samples was so great that by the close of the first day the urns were nearly emptied of their contents. They were refilled, but in a day or two were almost empty again. As the supply available was not sufficient to continue this free distribution very long the urns were shortly filled with palms, shrubs and plants. A further supply of such decorative material was used with good effect at different points on the trophy. A large number of electric lights were arranged in the arches and circles so as to illuminate the whole trophy, and it was thus made to appear very attractive at night.

'A number of excellent photographs were displayed in convenient places about the trophy which interested the visitors very much. These included views of the Experimental Farms, fruit farms, scenes in connection with ranching, also with harvesting in Manitoba and the North-west Territories. Good views were also shown of settlers' homes, giving the appearance of the farm when first located, and again a few years later under improved conditions.

GOOD RESULTS FROM THE EFFORT.

'The results of the installation of the agricultural exhibits at Glasgow were very satisfactory. No other display of the sort could be compared with it, and the material was all in place before the opening day. The agricultural trophy elicited the admira-

tion of visitors on every hand for its colossal character, and for the great variety and high quality of the products of which it was constructed. Much of the material for this magnificent display was provided from the crops of the experimental farms, the branch farms at Brandon and Indian Head being the largest contributors. The straw of the samples of grain sent from the North-west was wonderfully clean and bright, and commanded the admiration of many of the old country farmers.'

THE CANADIAN FRUIT DISPLAY.

The display of fruit was also large and varied and highly creditable. This was in charge of Mr. Robert Hamilton, of Grenville, Que. Lists of the varieties of fruits deemed most desirable for showing in Glasgow were prepared by the writer when at the Paris Exposition in conference with Mr. A. McD. Allan and Mr. R. Hamilton. These lists were forwarded to Ottawa and the fruit was secured in good season. As soon as collected it was sent at once to cold storage in Montreal and from Montreal to cold storage in Glasgow early in the spring. On arrival in Glasgow the fruit was placed in cold storage there and taken out from time to time as required. When the packages were opened, the fruits, which were chiefly apples with a few pears, were found to be in excellent condition. The total supply sent was about 400 bushel boxes and five barrels. The number of varieties of apples shown at the opening of the exhibition was over 60, and included all the leading commercial sorts grown in nearly all the apple producing districts of the Dominion. The display of Canadian fruit was well maintained to the close of the exhibition, and at that time there were over 30 varieties in a good state of preservation. In connection with the exhibit of fresh fruit there was also an extensive collection of other sorts of Canadian fruits preserved in antiseptic fluids. These also were attractive in appearance and gave to the exhibit additional charms.

The fruit sent from Canada was practically the only good display of the sort at Glasgow, and was a constant source of wonder to the many thousands of visitors who daily gathered around the exhibition tables. These repeated exhibits of choice fruits at the large European exhibitions are doing much to dispel the mistaken ideas held—even by educated people—regarding the climate of Canada and at the same time have brought the excellent quality of Canadian apples prominently before a large number of European consumers. The notices given by the press were most flattering, and the excellence of Canadian food products was thus brought under the notice of a large number of people in Great Britain who were unable to be present at the exhibition.

SHOW OF CEREALS FROM THE HARVEST OF 1901.

Later in the season another collection of representative samples of Canadian grain was forwarded from the experimental farms at Brandon, Manitoba, and Indian Head, N.W.T., all fresh from the wonderful harvest of 1901. These were kept together and shown in a separate group, and assisted much in maintaining the interest in the Canadian display to the close of the exhibition.

THE PAN-AMERICAN EXPOSITION AT BUFFALO, N.Y.

A very complete and attractive exhibit of cereals and other agricultural products was prepared by the Experimental Farms for the Exposition at Buffalo. A commodious building was erected there by Canada, and this exhibit filled the greater part of the central court. The experimental farms all contributed to this display, but the greater portion of the material was supplied by the Central, Brandon and Indian Head farms. Grain in the straw was a prominent feature in this exhibit, and the large well-matured heads, with long bright straw especially of that from the farms at Brandon and Indian Head was much admired. Large collections of all the best varieties put

up in small bunches labelled and shown under glass formed a very instructive feature in this exhibit. There were also a large number of different sorts of cereals of very fine quality shown in glass jars tastefully arranged on stands. A good display was made of pease, beans, Indian corn, millets and many other agricultural products, including a good collection of the more important grasses of Canada, the latter put up under the supervision of Dr. Jas. Fletcher, Botanist of the Experimental Farms. The walls above the glass cases of grain in straw and grasses were panelled with various designs ingeniously worked out with different varieties of agricultural crops. These had a pleasing effect and were much admired. These designs were made at Ottawa by the farm foreman, Mr. John Fixter, and worked out under his supervision. He also put up a very fine display of honey produced at the apiary at the Central Farm which attracted much attention. I had the opportunity of visiting this exposition twice during the season, and found that the Canadian exhibit attracted a large number of visitors who were unstinted in their praise of the magnificent samples and high quality of the agricultural products shown.

REPORTS ON SOME JOURNEYS MADE.

It has been my pleasure to attend many important gatherings of farmers, fruit-growers and others during the past year, where I have had opportunities of giving addresses and of joining in the discussion of the subjects under consideration. It has been a matter of regret that the many pressing duties connected with my office have prevented me from accepting more of the kind invitations which have been received, and which under other circumstances I should gladly have responded to.

VISIT TO THE EXPERIMENTAL FARM, NAPPAN, N.S.

On my return journey from Sable Island I paid a visit to this farm, arriving May 24, when I carefully went over the different branches of work carried on there, and discussed future plans with the Superintendent with the object of making the work of this farm increasingly useful to the farmers of the maritime provinces. I found the stock in good condition. The recent additions to the barn accommodation will enable the Superintendent to enlarge his work in this direction, and the added conveniences will permit of the work being conducted to greater advantage.

The farm fields were in good order, but the season was backward and unfavourable, and the crops were not all in. Those which had been early sown were well up and looking healthy. An additional area of land had been cleared which will be gradually brought under cultivation. The general appearance of the farm and the condition of the buildings and stock showed evidences of careful management. Some useful additions have been made to the dairy herd by the recent importation of valuable animals from Great Britain. The flock of sheep has also been greatly improved during the year by disposing of the less desirable animals, and the addition of a number of pure bred Leicesters and Shropshires.

In the horticultural branch additions have been made to the varieties of fruit under test, and also to the collection of ornamental trees and shrubs. The group of perennial plants has been enlarged and additional supplies of flowering bulbs provided.

VISIT TO THE EXPERIMENTAL FARM AT BRANDON, MAN.

In journeying west on my annual tour of inspection of the Experimental Farms, I arrived in Brandon on August 16. Harvesting had begun, and during the two or three days previous had made rapid progress, and on many farms a considerable area

Canada's Agricultural Trophy at the Glasgow Exhibition.

was in stook. The weather was very fine and almost everything looked promising. The farm presented a neat and attractive appearance with its long, straight lines of experimental plots, on many of which the crops were now ripening. The cereals all looked well, excepting some of the oats which had suffered somewhat from rust. Indian corn was growing very fast and promised a heavy return, field roots were also progressing satisfactorily. Hay has been a very heavy crop ; the awnless brome grass and western rye grass have both done particularly well. The cattle in the pasture fields were in good condition, so also were the pigs and poultry. The buildings, implements and the grounds generally all bore evidence of good care. The crops have yielded well as will be seen from the annual report of Mr. S. A. Bedford, the superintendent. Some of the neighbouring farms were visited and most of those well worked promised crops about equal to those on the Experimental Farm.

Many of the trees in the Pyrus orchard had bloomed abundantly, but had been so injured by frost in June that there was very little crop. The plums had escaped injury from frost and the trees were well laden with fruit. Among these were a large number of new seedlings, none of which were ripe at that time, but on my return from the Pacific coast on the 12th September when I paid a second visit to Brandon, many of these varieties were ripe and proved of good quality. The small fruit plantations, the trees and shrubs in the arboretum and the hedges had all made satisfactory growth. The Dakota Cotton Wood *Populus deltoidea* which has until recently been a very promising tree on account of its thrifty and rapid growth has for two or three years past been seriously affected by a yellow rust on the leaves which has destroyed the foliage and so weakened the trees that many of them have been killed outright. This is a serious trouble which seems to be spreading fast in Manitoba, and it is doubtful if it is wise to plant this cottonwood to any great extent as a timber tree on account of its liability to this disease. The Russian poplars so far have been free from this trouble. Samples of the diseased leaves were forwarded to Dr. Jas. Fletcher, Botanist of the Experimental Farms, and in his portion of this report particulars will be found of some of the characteristics of this troublesome growth.

The flower beds about the buildings were full of bloom, and were much admired by visitors of which there were a goodly number every day.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

This farm was reached on August 19, when a careful examination was made of the crops, not only on the Experimental Farm, but on other farms in the district. Some of the grain had been cut, but the harvest was two or three days later than in Manitoba, and the yields were much heavier. The heads on some of the oat fields were so packed as to look from a little distance almost like a solid mass of grain. It was then estimated that some of the fields would give 100 bushels per acre. Wheat also has given larger crops than was expected. A perusal of the returns given by Mr. A. Mackay, superintendent, in his annual report appended, show most remarkable and unprecedented yields, and the neighbouring farmers have in many instances grown crops as large as those on the Experimental Farm. The hay crop has been unusually large. Indian corn gave very heavy returns, mangels and turnips also did well. The farm was found in its usual excellent condition, and reflected credit on the manager.

The crop of fruits was also heavy. A considerable number of the Siberian crabs, *Pyrus baccata* bore such abundant crops that the trees had to be propped up to prevent them from breaking. These fruit trees which have proven perfectly hardy wherever tested in the North-west bear fruits of varying size, on some trees they are very small, on others they are of good size, but they all make excellent jelly if properly treated.

The Making of Jelly from the fruit of Pyrus baccata.

Some of the varieties are astringent, and many experiments have been tried in Ottawa to ascertain the best method of treating these fruits to obtain jelly of high quality and free from astringency. These experiments were conducted by Dr. C. E. Saunders, who has prepared the following notes:—'In order to avoid unpleasant astringency in the jelly the following directions should be carefully carried out. Let the fruit be kept for some time after picking until it is thoroughly ripened. Take one quart of fruit, add about three pints of water, boil for about half an hour crushing the fruit when soft. Strain, first through a cullender and then once (or twice if a very clear product is desired) through a cloth. Heat the liquid to boiling ; add sugar and boil until it will set. This should take about ten minutes. The jelly should not be made very stiff. The amount of sugar to be added depends on whether a sweet or an acid jelly is desired. For a quart of fruit the quantity of granulated white sugar may vary from about a pound to two pounds. In the first case about one and one-quarter pints of jelly should be obtained, and in the second case a little more than a quart. The jelly from *Pyrus baccata* so made should be of a brilliant red colour and of high quality.'

A considerable number of these trees have been sent to settlers in different parts of the North-west during the past five years, and in some instances have now reached a bearing age.

A Disease Affecting Manitoba Maple Seed.

While visiting this farm my attention was called to a disease which has affected the crop of Manitoba maple seed this year, and which has practically destroyed it all through the Indian Head district and as far west as Pense. This disease affects, first, the ends of the wings of the seeds which dry up prematurely, and the disease extends from there to the seed itself. As the disease advances dark spots appear which show through on the seeds, and when these are torn open the interior is found to be dark coloured and empty. A sample of this diseased seed was sent to Dr. Jas. Fletcher, and in his report appended fuller reference is made regarding this new pest.

The plum trees at this farm also gave an abundant crop, and some of the varieties ripened well and were of good quality. The season was remarkable for the rapid growth of all sorts of forest and ornamental trees and shrubs. Flowers also did remarkably well.

VISIT TO REGINA AND PENSE.

A day was spent in examining the crops from Regina to Pense. The grain was found to be very heavy, and although the wheat was a little later in ripening than it was at Indian Head it matured well and was safely harvested before frost came. At Pense I visited the farm of Messrs. Spring-Rice, where I found very much to interest me. The crops were very fine and gave evidence of good farming, and the blocks of trees and shrubs were well cared for and making very excellent growth. A large proportion of these have been grown from young plants and seeds received from the experimental farms. Many interesting flowering shrubs and plants were also found here all in a thriving condition.

VISIT TO SOUTHERN ALBERTA.

From Medicine Hat a trip was made to Lethbridge and from there south along the line of the large irrigation canal recently constructed by the Canadian North-west Irrigation Company, known as the Galt Irrigation Canal, which draws water from an inexhaustible supply in lakes fed by the melted snows of the Rocky Mountains from

which flows the St. Mary's river. The length of the main canal is 61 miles, of the Lethbridge branch 32 miles, and of the Stirling branch 22 miles, making the entire length of this canal system, 115 miles. Water is now available for the irrigation of about 200,000 acres of land lying between the intake on the St. Mary's river—about five miles from the Montana boundary—to the town of Lethbridge. This great engineering work is likely to transform this section of country from one of comparative barrenness (for lack of necessary moisture) to one of great fertility.

Through the kindness of Mr. A. T. Galt, and of the manager of the Irrigation Works, Mr. C. A. Magrath, I was given facilities for seeing this remarkable work. Nine years ago I drove across a portion of this country it was then almost uninhabited, a few bands of cattle only, then ranged the plains, and the only settlement of any size was Cardston. This was a Mormon settlement, numbering then about 400. Since that time the population of the district has increased to fully 4,000 people, and the increase has been most striking during the past two years. About Lethbridge the settlement is of the usual character, and consists of a mixture of nationalities, but that lying south-east of what are known as the 'Rolling Hills' and extending to the Montana boundary is almost entirely Mormon.

GROWTH OF THE MORMON SETTLEMENT.

In addition to the thriving town of Cardston, which now has a population of 1,200, there are two other rapidly growing towns, Magrath and Stirling, both of which were started in 1899. Magrath has now about 600 people, and Stirling 550. At each of these new settlements there were about 2,000 acres under crop this year. At each place eight sections of land containing in all 5,120 acres, are inclosed with a common fence and within this all the crops of the community are protected from the inroads of stock. The houses of the settlers are well built, most of them being neat and comfortable with pleasant surroundings. The streets are wide, and each house has about an acre of land which in most instances is well cultivated with garden vegetables, flowers and small fruits. Evidences of industry and frugality were everywhere seen. The vice of drunkenness is scarcely known among the Mormons, a very large proportion of them being total abstainers. Further, a considerable number of them drink neither tea nor coffee, using only milk or water as they believe this practice to be healthier and find it also more economical.

Polygamy which is usually associated with Mormonism in the minds of most people, seems to be practically dead. It is said to be no longer a doctrine of the church, and as far as could be learned there was not the slightest evidence of such practice existing anywhere among the Mormons in Canada. They seem to be a law-abiding and industrious community, and their methods of co-operation are very helpful to the rapid progress of their settlements and the contentment of their people. In each settlement the head of each family is visited once a month by two of the leading men of the community, the wife also being visited at similar intervals by two of the leading women. During these friendly visits inquiries are made as to the health of the family and as to whether its supplies of food are sufficient, and when cases of suffering or want are discovered efforts are at once made to relieve them.

One of the funds available in the community for relief purposes is known as the 'Fast Fund.' Every family is said to have a fast day once a month, and on that day only one meal is eaten. The value of the other two meals is estimated and an equivalent sum given to the fast fund. This practice, it is alleged, does the fasters no harm, and provides a fund to which all contribute from which supplies can be drawn for the relief of the needy. By such methods much is done to bind each family to the community by bonds of sympathy and common interest.

A Proposed Beet Sugar Factory for Southern Alberta.

One of the wealthy men of Utah, Mr. Jesse Knight, who is reputed to have large revenues from mines in that state, takes a very active interest in the Mormon settlements of Alberta. He has recently purchased a large cattle ranch not far from the irrigated districts, of 100,000 acres for one of his sons, stocking it with 5,000 head of cattle, at a total cost of about $450,000. He has also bought another large tract of land on which to found a new town and settlement, adjacent to the irrigation canal, to be named after his other son, Raymond, where Mr. Knight is about to establish a large beet sugar factory. A party of surveyors were working on the open prairie laying out this town site at the time of my visit, contracts had been made for the ploughing of 3,000 acres of land to be completed before the end of the season, and a number of four-horse teams were then busily engaged in this work. Some of the pioneer settlers for this new town had already arrived, and in the meantime were living in tents. The 3,000 acres then being ploughed will be cropped with grain in 1902, and the following year will be in condition for the growing of sugar beets. Each farmer coming into the settlement will have eighty acres of land and will contract in his deed of purchase to grow not less than ten acres of sugar beets each year, and in this way an abundant supply of beets will be assured. Mr. Knight is an ardent prohibitionist, and is having a clause put in each of his deeds of sale providing that in case of the establishment at any time of any saloon or drinking place on any part of this property, such property shall be forfeited and revert to the original owner. It is expected that the beet sugar factory will be completed during the year 1902, and be ready to utilize the crop of 1903.

A DRIVE OVER THE FOOTHILLS OF THE ROCKIES.

Leaving Cardston a drive of fifty miles was taken over the rolling plains, which form the base of the foot-hill country, crossing the Blood Reserve and ending at the town of Pincher, which is situated on the line of railway through the Crow's Nest Pass. Many settlers are coming into this district, and the crops throughout this part of the country have been very encouraging. Notwithstanding its high elevation of from 3,000 to 3,500 feet the climate is such that fall wheat is grown in many localities quite successfully. This now forms an important crop, both at Cardston and Pincher, many of the farmers reaping from 30 to 40 bushels per acre. The variety chiefly grown at Cardston is a beardless red-chaff wheat known as Odessa; that grown at Pincher is a bearded wheat the name of which has been lost. In all these settlements the people are in the midst of a good ranching country where cattle live in the open during the winter and most of the residents own more or less stock.

THE GREAT COAL DISTRICTS.

After going through the Crow's Nest Pass a day was spent at Fernie, the centre of the great coal producing district, visiting the mines. The output of the mines there at that time was about 1,200 tons per day. A large proportion of this coal is made into coke which is used for the smelting of ores in the mining districts. Three hundred coke ovens were in operation at Fernie, and one hundred more were being built. At St. Michael, 25 miles east of Fernie; two hundred coke ovens were also in course of erection, and some fine seams of coal are being opened there. The supplies of coal in this part of the Dominion are so vast as to be practically inexhaustible.

VISIT TO THE EXPERIMENTAL FARM AT AGASSIZ, B.C.

Pursuing my journey westward I reached Agassiz, B.C., early in September. I found the crops of grain at the Experimental Farm very good. Wheat, barley and oats have all yielded well. The hay crop had been unusually heavy, and Indian corn, field roots and potatoes were very promising. Particulars of all these will be found in the report of the superintendent, Mr. Thomas A. Sharpe. The crops on the Experimental Farm may be taken as a fair index as to those on farms generally in the coast climate.

The fruit crop in the Fraser river valley in which the Experimental Farm is located, was disappointing. Cold and wet weather in the spring prevented much of the fruit from setting, so that there was comparatively few apples and pears. Later in the season rot prevailed in the plums to such an extent that a considerable proportion of this crop was destroyed. The fruit trees in the more newly planted orchards were making satisfactory progress. The trees in the nut orchard had made good growth, and considering their age were bearing well. The forest and ornamental trees were making rapid growth, and many of the shrubs and flowers blooming well. An additional area of land has been cleared to provide for increased pasturage and an enlargement of the orchards and to give additional areas for field crops in the near future.

The stock including the pure bred short-horns recently sent from Ontario were doing well, and the swine, sheep and fowls were all making satisfactory progress.

In the interior of British Columbia the fruit crop was said to be good and of excellent quality, but the limited time at my disposal prevented me from visiting any of these districts this year.

ACKNOWLEDGMENTS.

It gives me much pleasure to acknowledge gratefully my obligations to those who have rendered me special services. To the United States Department of Agriculture to whom I am indebted for a number of different sorts of cereals and other farm crops, to Dr. C. Doxrud, of the Technical School, of Christiania, Norway, for samples of cereals and other agricultural products grown in Norway. To the Director of the Royal Gardens, Kew, England, for seeds of trees, shrubs and plants from many countries, and to the Director of the Arnold Arboretum, Jamaica Plains, Mass., for seeds of promising shrubs. Also to Prof. John Macoun, Naturalist of the Geological and Natural History Survey, and Mr. J. M. Macoun, assistant naturalist, for seeds of interesting Canadian plants.

Acknowledgments are also due to the officers at the Central and Branch Experimental Farms, for faithful services rendered and for their earnest co-operation in carrying out the many lines of work planned.

My hearty thanks are also due to those members of the staff who have rendered me help in those branches of the work over which I have had personal charge; to the horticulturist, Mr. W. T. Macoun, who has supervised the labour given to the trees and shrubs, and to the lawns on the experimental grounds; to the farm foreman, Mr. John Fixter, who has carefully watched over the different branches of the work, has taken special charge of the experiments with fertilizers and made the notes thereon, he has also helped me much by many practical suggestions; to Mr. George Fixter, who has managed the work connected with the experimental plots of cereals, fodder crops and field roots, and has taken records of the growth and yield of all these, and has thus aided me much in furnishing material for the preparation of this report, to him I am also indebted for the careful management of the many details connected with the dis-

tribution of samples of seed grain, and to Mr. Wm. Ellis, who has done careful work in testing the vitality of seeds, in the management of the greenhouse plants, in the propagation of many useful and ornamental species and in the taking of the meteorological records.

I desire also to acknowledge the faithful services of my secretary, Mr. Malcolm O'Hanley, to whose energy and industry I owe much of the success which has attended my general work. The employees also of all the farms in every branch of work are deserving of mention since they have shown commendable care and have faithfully discharged their respective duties.

WM. SAUNDERS,
Director Experimental Farms.

REPORT OF THE HORTICULTURIST.

(W. T. Macoun.)

Wm. Saunders, Esq., LL.D.,
Director Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit, herewith, the fifteenth annual report of this division. During the past year many experiments were made with trees, shrubs, herbaceous plants, fruits, and vegetables, and a large amount of useful data was obtained, but owing to the necessarily limited space available, only that which it seems most desirable to publish is given.

Character of Season.—Last winter was very unlike the previous one, for, while the weather during the winter of 1899-1900 was very changeable, that of 1900-1 was quite the contrary, and was noted for its long spells of cold weather. The winter set in very early, as snow fell on November 14, and remained. On account of this early fall of snow, and more following before very cold weather, the ground was protected from frost, and there was practically no frost in the ground all winter, a very unusual occurrence at Ottawa.

December was a cold month, the temperature falling to 18·8° F. below zero on the 10th. There was a considerable quantity of snow, and by Christmas there were fully 18 inches on the ground.

During the month of January there was very little mild weather, and no real thaw. The lowest temperature was on the 20th, when it was 25·5° F. below zero, which was the coldest day of the winter. During that month the snow increased in depth, and by the end of the month there were fully three feet on the ground. February was a very cold month, and the temperature did not rise above the freezing point from January 22 to March 2. While there were no heavy falls of snow in February, that which came remained. The snow did not apparently begin to get less until about the middle of March, and then it went slowly, as the weather was not warm, and it was very cloudy from March 21 to April 10. After April 1, the weather became considerably milder, and when it became bright on April 10, the snow was all gone except in the drifts. The heavy covering of snow all winter and the absence of frost in the ground afforded good conditions for the wintering of herbaceous plants, and such things came through well, the strawberries, especially, being in fine condition. There was, however, an unusual injury in the nursery among the young apple trees, as the bark of many of them was badly split within a foot of the ground. The trees grew until very late last autumn and the snow fell early on the unfrozen ground when the young trees were well charged with sap. The cause of the splitting was probably due to the fact that the snow prevented the frost from reaching the lower part of the trunk until very cold weather came, and then the severe frost caused the bark to burst.

Many ornamental trees and shrubs which have been quite hardy or nearly so in the past had a large amount of wood killed by winter. Fruit trees also suffered in their tops much more than usual, while raspberry canes were badly injured, and in consequence the crop was practically a failure in this district.

As there was no frost in the ground, it was only necessary to wait until the snow disappeared and the soil dried sufficiently to begin outside work. The first ploughing of the season was done in the orchard on April 12, and hand labour on April 8.

The spring continued very favourable for work, and there was scarcely any frost

after the early part of April. The warmest day in April was on the 28th, when the temperature was 79·8° F. Everything was well advanced by the middle of May, and at that time the season was fully a week earlier than in 1900. The warmest day of the month was on the 8th, when the temperature rose to 81·2° F.

There had been very little rain all spring, but beginning with May 10, there were few days on which it did not rain until after June 3. This long period of rainy weather had a bad effect on the setting of fruit, as the conditions for the fertilization of the flowers were very unfavourable. As a result, the crop of apples, plums, and grapes was much lighter than it would probably have been otherwise.

June was a warm month all the way through, and beginning with the 24th it was hot, the temperature rising to 96·8° F. on the 28th. This hot weather continued till July 2, when the heat moderated, but from July 12 to 18, there was another hot spell, the highest temperature of the year being recorded on the 16th, when it rose to 99° F. This hot weather lessened the strawberry crop considerably, and was very injurious to potatoes, except where there was thorough cultivation. August was also a warm month, but not as warm as July. September was mild to warm. The first frost, which was a very light one, occurred on the 20th, when the melon vines were injured, but tomatoes were not hurt. There was a very high wind on the 28th which blew off a great quantity of apples and blew down several trees. The weather was fine and mild in October and very favourable for fall work. The temperature did not fall below 30° F. until the 28th, when it went down to 27° F., killing the foliage of the grape vines. Up to this time such tender plants as Cannas had not been killed, and in sheltered places tomato vines were still green. The early part of November was also very favourable for outside work. On the 13th there was a heavy rain, which, freezing on the trees, weighed down the branches very much and many were broken, the cut-leaved birches suffering most of all. Four inches of snow fell on the 14th and remained, and winter may be said to have set in on that date.

Fruit Crop.—The season of 1901 was not, on the whole, a favourable one for fruit. Owing to very rainy weather during the blossoming season the apples, plums, and grapes did not set their fruit as well as usual, but there was not a good show of bloom on the apple trees from the outset, and the crop of this fruit was small, but of good quality. There was a fair crop of American plums, but the flower buds on the European varieties were winter killed, and hence there was no fruit from them. The pears had been so badly blighted in 1900 that there were few of the trees in condition to bear fruit, and hence there was practically none of that fruit. The flower buds of the cherries were killed by winter, and there was no crop. The raspberry crop throughout the Ottawa district was practically a failure, the canes having been badly injured by winter and in many cases killed outright. Although bent down at the experimental farm, for greater protection, they suffered badly, and there was a very light crop of this fruit. Strawberries came through the winter well and promised a very heavy crop, but hot, dry weather came during the ripening season which lessened it considerably, though the crop on the whole was good. The grapes ripened well, but owing to poor fertilization of the flowers the crop was light.

The potato crop, which was light in the Ottawa district, was good at the Farm. Tomatoes ripened well and there was a large crop this year. This was a favourable season also for tobacco, the yield being good, and most varieties were well matured.

PROGRESS OF THE WORK.

The work of the Horticultural Division continued to progress favourably this season, and most of the experiments undertaken in former years were carried on again.

During last winter a bulletin of 74 pages on Apple Culture was prepared by the Horticulturist and published in April, 1901. There has been a great demand for this bulletin, and it is hoped that it will prove useful to Canadian fruit-growers.

The top grafting f the more tender varieties of apples was continued again this year, though many of those grafted in the past suffered from blight in 1900 and were injured by frost last winter. There is still good evidence, however, of the value of top grafting some kinds which would not otherwise succeed here.

A seedling apple orchard was begun this season, and 494 trees planted, most of which had been grown from seed of apples ripened here. It is hoped that from these seedlings a productive, hardy, late-keeping dessert apple of good quality will be obtained, as such a variety is much needed here.

Many new varieties of apples were obtained from various sources, some of which were root grafted and others top grafted. The number of varieties in the orchard was also increased by young trees from the nursery.

The American plums are proving very useful in this district, and there is now a large collection of named varieties in the orchard. As they fruit, these are described and those found the most satisfactory recommended for planting. A large number of seedlings have been raised from some of the best sorts, and as they fruit they too are tested and described, and if found to be of inferior merit, discarded. A few sorts of great promise have already been obtained.

A new currant plantation was made last spring containing 111 varieties ; a strawberry plantation containing 218 varieties, and this autumn a raspberry plantation was made of 63 varieties.

Many experiments with vegetables were conducted this year, and the average results of some which have been carried on for five and six years obtained, which are very valuable as a guide to farmers and market gardeners. The List of Best Vegetables for Farmers, published in this report, gives in a concise form the conclusions reached regarding the merits of the different sorts.

Experiments in testing different varieties of tobacco were continued, and the crop was harvested in good condition and cured in the tobacco house. This was a favourable year for tobacco, it having ripened and cured well.

Measurements were again taken in the forest belts of the annual growth in height and circumference of the different kinds of timber trees, and new plantations were made where other trees had not succeeded.

The Arboretum never looked better than it did this year. Large additions were made to the collection of herbaceous perennials, and some new sorts of trees and shrubs were planted. Five hundred and twenty-five species and varieties were obtained last spring and planted in nursery rows and will be put in their permanent positions next spring. Notes were made again this year on the hardiness and growth of the different species and varieties.

As in the past, the correspondence has occupied considerable time, but this is one of the best means of conveying information obtained from the experiments conducted here direct to those who are most anxious to get it.

The experiments made with a lime mixture for the destruction of the oyster-shell bark-louse were continued last winter, and additional experience gained as to the value of this remedy. Bordeaux mixture and Paris green were used very faithfully in spraying for fungous diseases and biting insects, and the good results from these applications were, as a rule, very apparent. Other mixtures and solutions were used in smaller quantities.

Meetings attended and Places visited.—I had the pleasure of attending eight meetings during the past year, and while there endeavoured to be of as much service as possible to the farmers and fruit-growers with whom I came in contact.

At the meeting of the Nova Scotia Fruit Growers' Association, held at Wolfville, N.S., on January 28, 29 and 30, I gave an address on 'The Development of

Spraying in Canada,' and at the meetings of the Farmers' Associations, at Kentville, N.S., an address on 'Potato Culture.' From Nova Scotia, I went to Prince Edward Island, attending a special meeting of fruit-growers at Cardigan on February 5, and the meeting of the Farmers' Association at Middleton on the 8th. The meeting of the Prince Edward Island Fruit Growers' Association was held at Charlottetown on February 6 and 7, at which I gave an address on 'Apple Growing.' It was also my pleasure to attend the summer meeting of the Quebec Pomological Society, held at Rivière du Loup, Que., on August 20 and 21, where I gave a lecture on 'Hardy Fruits.' On September 12 and 13, I was present at the meeting of the American Pomological Society at Buffalo, N.Y., and delivered an address on 'Orchard Renovation'; and at the meeting of the Ontario Fruit Growers' Association, held at Cobourg, Ont., on December 4, 5, and 6, I gave a talk on 'The American Plum.'

While at Buffalo, in September, I visited the Pan-American Exhibition and studied the fruit in the large collections there, and during the same absence from home I visited the Agricultural Experiment Station, at Geneva, N.Y., and the Experiment Station at Cornell University, Ithaca, N.Y., in order to learn something of the work being done at these stations and something which would be helpful in my work at Ottawa. Returning homewards, I visited several fruit farms in the Grimsby district and examined the trees and crops there. During the autumn, I also visited the orchards and nursery of the Trappist Fathers at Oka, P.Q., and found much of interest there. At the same time I visited the orchards of Mr. R. W. Shepherd, Como, P.Q., where there was much to be seen that will be useful to me.

Acknowledgments.—I have much pleasure in acknowledging, and am very grateful for, the many kindnesses shown me by fruit-growers both in Canada and the United States. Information which it was necessary to have, in order to do my work with greater accuracy, has been freely given by many fellow-workers, and I fully appreciate the value of such help. To the fruit-growers of Ontario and Quebec, who assisted me in getting the necessary data to compile the district apple lists for my bulletin on Apple Culture, I am particularly grateful, as the ready response to my inquiries made it possible to make the lists much more accurate than they would have been otherwise.

I again take the opportunity of acknowledging the services of Mr. J. F. Watson, secretary to the Horticultural division, whose knowledge of the work relieves me of much office work which he is thus able to do himself. Mr. H. Holz, the foreman, continues to superintend the outside work satisfactorily, and I am pleased to note the great interest he takes in it.

Donations.—The following donations were received during the year, and this opportunity is taken to gratefully acknowledge the same :—

DONATIONS.

Sender.	Donations.
Arboretum, Arnold, Jamaica Plain, Mass., U.S.	Seeds.
Beall, Thos., Lindsay, Ont..	Scions of late red apple.
Beach, Prof. S. A., Geneva, N.Y....	Grape cuttings.
Botanic Garden, Durban, South Africa..........	Seeds.
Botanic Garden, Madras, India....	Seeds.
Brodie, R., Montreal, P.Q......................	Scions of a red Fameuse apple.
Cockburn, J. C., Gravenhurst, Ont.............	Scions of Nora, Minto, and Sally Brown apples.
Dempsey, W. H., Trenton, Ont..................	Samples of 44 varieties of fruit. Apple scions.
DeWolfe, M. G., Kentville, N.S..................	Bulbs.
Dupuis, Aug., Village des Aulnaies, Que........	Tree and scions of Amaryllis plum, and seedling apple scions.
Fonthill Nurseries, Fonthill, Ont......	Scions of 8 Japanese plums.
Guay, A. E., Ville Marie, Que....	Currant cuttings.
Hamilton, Robert, Grenville, Que..............	Childs and Blair crab apple scions.
Hodgins, A. S., Osnabruck Centre, Ont..	Apple scions.

DONATIONS—*Concluded.*

Sender.	Donations.
Hutt, Prof. H. L., O.A.C., Guelph, Ont	24 plants of Irene and Jucunda strawberries.
Iowa Horticultural Society, Davenport, Ia	Plum scions.
Jack, N. E., Chateauguay Basin, Que.	Scions of Cox's Orange Pippin apple.
Kerr, W. J., Renfrew, Ont	50 plants Shaffer raspberry.
Knox, A., Chesterfield, Ont	Apple scions.
Lalonde, A., Isle Perrot, Que	Scions of unknown apple.
Lathe, H., Lacolle, Que	Apple scions.
Leonard, E., Cobourg, Ont	Scions of unknown apple.
Macoun, J. M., Geological Survey, Ottawa	Seeds.
Matheson, Miss Joan, Perth, Ont	Scions of Rufus apple.
McFarland, F. H., Hyde Park, Vt., U.S	Scions of Roseau, McLure Pippin, Russian, Baldwin, Aurora, and Corliss Red apples.
Royal Botanic Gardens, Kew, England	Collection of seeds.
Sears, F. W., Snow View Garden, via Naini Tal, N.W.P., India	100 nuts of *Juglans regia.*
Shepherd, R. W., Como, Que	Scions of Early Joe and La Rochelle apples.
Stubbert, G. E., Little Pond, C.B., N.S	Apple scions.
Terrill, A. M., Picton, Ont	Seeds of Terrill's Early tomato.
Tuttle, A. G., Baraboo, Wis., U.S	Scions of Repka Malenka apple.
Van Fleet, Dr. W., Rural New Yorker, N. York.	*Rosa wichuriana hybrid.*
Walker, Jos., Strathroy, Ont	Scions of unknown apple.
Wallenshlager, C., New Edinburgh, Ont	Scions of seedling apple.
Wilkins, O. F., Bridgebury, Ont	Seedling grape cuttings.
Young, Charles, Richard's Landing, Ont	Scions of seedling apple.

I have the honour to be, sir,

Your obedient servant,

W. T. MACOUN,

Horticulturist.

APPLES.

While there was practically no root-killing in the apple orchard last winter, trees died on account of the severe weather, evidently being weakened by blight in 1900. There was more injury to the tops of the trees than there has been for some years, probably due to long continued cold, dry weather, which caused more evaporation of moisture than the trees could stand.

Two trees each of Ben Davis and Stark, the former planted in 1890, and the latter in 1891, were killed outright, and two trees of Gano, planted in 1891, were much weakened. These are given as examples of comparatively hardy varieties which were affected by last winter. During the summer 17 trees were blown down and in nearly every case the trunk was rotten almost entirely through. These trees had all been planted since 1887. Every year a number of trees go in this way, and it is difficult to tell what is the real cause, as it is not restricted to the tenderer varieties, but even the so-called iron clads rot in this way. The orchard has suffered much in past years from blight and root-killing and many trees are affected with the so-called black heart, and all these combined weaken them very much. The trees on the whole, however, look healthy and have been improving in this respect from year to year. The Russian orchard, comprised mostly of varieties of Russian origin, looks particularly well, the trees being healthier than in the standard orchard.

The crop of apples was light this year. There was not a good show of bloom to begin with and the wet weather which occurred during the blossoming season was very unfavourable to the pollination of the flowers, the result being that comparatively few apples set. Varieties which had good crops on some trees were McMahon White, Wealthy, Patten's Greening, Duchess of Oldenburg, Haas, Cross, Longfield, and Salome.

There was little blight in the orchard this year, and the season was a favourable one for growth. The cover crop in a large part of the standard orchard was ploughed under on April 13, and after cultivating several times to kill sod, the ground was re-sown with common red clover at the rate of 12 lbs. per acre on June 4, which resulted in a good stand. The cover crop in all the Russian orchard was ploughed under on April 23, and the soil kept cultivated until July 29, when it was re-sown with clover, and there was a fine cover crop by autumn. In other parts of the standard orchard the clover was cut at intervals and allowed to rot, as has been the custom in previous years.

In the spring, 86 trees were planted in the apple orchards. Of these, 69 were to fill vacancies, and 19 were planted in an additional row which was made to the Russian orchard. The vacancies were caused by death and by the rooting up of trees of inferior varieties. The Tetofsky has not been found a profitable apple here, although the tree is very hardy. It is inclined to overbear, and the fruit is small and drops badly. In 1888, there were 40 trees planted of this variety, 27 of which were living last spring, and as the space was required for the testing of other kinds, 13 of these were removed.

During the past season the early varieties were sprayed three times, and the late varieties four times with Bordeaux mixture and Paris green, and the fruit was practically free from spot, though the Codling Moth did some injury. Last autumn 47 trees, which were more or less affected by the Oyster-shell Bark-louse, were sprayed with the lime mixture, and the results were very satisfactory, there being few scales left on the trees. The trunks of the trees and large branches were washed with the alkaline wash for the prevention of borers. This wash is made by reducing soft soap to the consistency of thick paint by the addition of a strong solution of washing soda in water, and is applied with a brush. Only two borers were found in about 1,200 trees, showing that the orchards are practically free from this insect.

Last winter was a very hard one on the young top grafted trees and some which had come through two winters without injury were killed outright. The blight of 1900 also had done much injury, both to the stocks and grafts, as a result there was a great set-back to this work. However, some varieties are doing well. The work was continued last spring and additional trees were grafted and others finished which had been begun in previous years.

SEEDLING APPLE ORCHARD.

Most of the named varieties of apples growing in America to-day were originated as seedlings. Our forefathers brought apple seeds with them from the old land and sowed them in this country. The young trees raised from these grew up and bore fruit, and occasionally a variety of merit would thus be produced, and then propagated. In later times chance seedlings grew up in the fence corners and other waste places, and these also bore fruit and added their quota of good sorts. From trees like these have originated such fine varieties as Northern Spy, Baldwin, Fameuse, McIntosh Red, and many others.

Of late years more systematic efforts have been made to originate new varieties from seed. But the varieties of really useful apples which have originated in this way have been very few indeed.

At the Central Experimental Farm at Ottawa, considerable work has been done in raising seedling apples, especially from seed of Russian varieties, but no kinds of great merit have yet been produced.

In the year 1890, an orchard was planted comprising about 3,000 trees grown from seed imported from E. Goegginger, Riga, Russia. The seed from which these were grown was said to have been taken from apples grown north of Riga, Russia. Of these there are now 898 remaining, the rest having been killed by blight or winter or removed on account of weak growth or inferior quality. These began to fruit in 1897, when about 50 trees bore. In 1898 there were 40 trees which fruited ; in 1899 there were 43 ; in 1900 there were 26, and in 1901 there were 18, making a total of 177 trees which have borne fruit. None of these apples are sufficiently promising to be worthy of special mention, but a few of them are as good as the majority of the named Russian varieties. Nearly all of them are summer apples.

As the Russian seedling trees had not produced any varieties of great merit (unless it be found that they are hardier than other kinds) it was decided to grow a large number of seedlings from the best varieties which had fruited at Ottawa, in order to try and obtain something good from them. Accordingly, seeds were sown in 1898, 1899 and 1900, and a large number of seedling apple trees raised from them, and this year 494 were planted out in the pear orchard, places being left for the permanent pear trees. The trees were planted 10 by 10 feet apart in most cases. The soil was kept thoroughly cultivated, and the young trees made thrifty growth. The trees were made up of the following :—79 seedlings of McIntosh Red, 65 Lawver, 63 Shiawassee Beauty, 53 Wealthy, 53 Swayzie Pomme Grise, 39 Scott's Winter, 39 Winter St. Lawrence, 26 Northern Spy, 25 American Golden Russet, 10 St. Lawrence, 9 Edgehill, 6 Gano, 5 Fameuse, 3 Salome, 1 Ribston Pippin, 1 Pewaukee, 17 miscellaneous (fruit not ripened here) ; total, 494.

In addition to these, the following hybrids, originated by Prof. John Craig, were planted :—5 Pyrus baccata, female, with Duchess of Oldenburg, male ; 8 Pyrus baccata, female, with Tetofsky, male ; 21 Pyrus baccata, female, with Martha, male ; a total of 34 trees.

SEEDLING APPLES.

Notwithstanding the poor crop of fruit this year, a number of seedlings were sent in for examination and description, among which were several of merit. It is always a pleasure to examine these fruits, and we trust that every year those who have new varieties will send them to the Horticulturist that he may compare them with other varieties.

Full descriptions are published of the most promising of those which were received :—

No. 203.—R. Hamilton, Grenville, Quebec. Apple seedling.—Size, medium to below, roundish, yellow, splashed and washed with deep red ; cavity deep, medium width ; basin deep, medium width, wrinkled ; stem short, slender ; calyx closed ; dots obscure ; skin thin but tough ; core, small ; flesh, white, crisp, very tender, juicy, tinged with red to core ; sub-acid, with a pleasant but peculiar flavour ; quality, good to very good ; season, December, January. Evidently a Fameuse seedling. Tested January 23, 1901.

No. 204.—Joshua Bull, East Farnham, Quebec. Apple seedling.—Above medium size, roundish to oblate, pale greenish yellow, splashed and washed with carmine ; cavity, medium depth, open ; basin, deep, medium width, wrinkled ; stem, medium length, slender ; calyx, closed ; dots, obscure ; skin, thin, moderately tender ; core, small ; flesh, white, tinged with red, tender, juicy ; mild sub-acid, with a pleasant flavour ; quality, good ; season, early October. Said to be a seedling raised by Joshua Bull, East Farnham, Que. Might prove useful if a good cropper. Tested October 15, 1901.

No. 205.—J. P. Jones, Echo Vale, Que. Apple seedling.—Large, roundish conical, pale greenish yellow, splashed and washed with carmine ; cavity, deep, medium

width, slightly russetted ; basin, medium depth and width, wrinkled ; stem, short, moderately stout ; calyx, closed ; dots, obscure ; skin, moderately thick, tough ; core, small ; flesh, dull white, tender, juicy ; sub-acid ; quality, good ; season, early winter. May be a desirable apple if tree is very hardy. Tested November 4, 1901.

No. 206.—A. Dupuis, Village des Aulnaies, Que. Apple seedling.—A medium sized, very productive apple of medium quality.

No. 207.—Thos. Armstrong, Springdale, Ont.—Stanleydale, apple seedling.—A large, pale yellow apple, lightly splashed with pink on sunny side ; quality, above medium ; season, evidently from mid to late September.

No. 208.—C. A. Cass, L'Orignal, Ont. Apple seedling.—Above medium size, roundish, pale yellow, almost covered with deep red, but a few patches only streaked with it ; cavity, deep, medium width ; basin, medium depth and width, wrinkled ; stem, medium length, moderately stout ; calyx, closed ; dots, moderately numerous, small, distinct, but not prominent, yellow ; bloom, rather heavy ; core, medium size ; flesh, white, tinged with red, crisp, juicy ; sub-acid, with a pleasant, Fameuse-like flavour ; quality, good ; season, probably early to mid September. A promising apple very much resembling Russell. Tested September 3, 1901.

No. 209.—Miss Joan Matheson, Perth, Ont.—Rufus, apple seedling.—Medium size, roundish conical, pale yellow, well washed with crimson ; cavity, narrow, medium depth, russetted ; basin, narrow, shallow, slightly wrinkled ; stem, short, slender ; calyx, closed ; dots, numerous, pale yellow, distinct ; bloom slight ; skin, moderately thick, tough ; core, small ; flesh, white, tinged with pink almost to core, juicy, tender ; sub-acid, pleasant flavour ; quality, good, almost very good ; season, mid-winter to late winter. Probably a seedling of Fameuse. Tested April 20, 1901.

No. 210.—E. Leonard, Cobourg, Ont.—Unknown apple.—Above medium size, roundish, conical, green, splashed and washed with deep red ; cavity, rather shallow, open ; basin, narrow, shallow, wrinkled ; calyx, medium size, closed ; dots, fairly numerous, pale, distinct, but not prominent ; skin. thick and tough ; core, medium size ; flesh, yellowish white, crisp, tender, juicy ; sprightly sub-acid, pleasant flavour ; quality, very good ; season, late winter.

No. 211.—T. W. Gibbs, Huntsville, Ont.—Apple seedling.—Above medium size, roundish conical, pale greenish yellow, splashed and washed with carmine ; cavity, medium depth and width ; basin, narrow, medium depth, slightly wrinkled ; stem, short, moderately stout ; calyx, closed ; dots, obscure ; skin, moderately thick, tough; core, medium ; flesh, white, tender, juicy ; sweet, pleasant flavour; quality, good for a sweet apple ; season, October. A good sweet apple for its season. Tested October 9, 1901.

No. 212.—C. Wallenshlager, New Edinburgh, Ont.—Large winter apple seedling.

Nos. 213 to 216.—Thos. Frankland, Stonewall, Man.—Maude, Laura, Myrtle, and Annie apples. All small apples which may prove valuable in Manitoba.

No. 217.—N. E. Jack, Chateauguay Basin, P.Q.—Norman, apple seedling.—Above medium to large, roundish, greenish yellow, well washed and splashed with deep red with a purplish tinge ; cavity, deep, medium width ; stem, short, moderately stout ; basin, narrow, medium depth, slightly wrinkled ; calyx, closed ; dots, small, yellow, moderately numerous, distinct ; skin, thick, moderately tough ; core, medium; flesh, yellow, juicy, rather coarse, mildly sub-acid ; quality, good ; season, mid-winter to late winter. A promising winter apple. This apple was partly described in the report of the Montreal Horticultural Society for 1883. It originated at Chateauguay Basin, P.Q., and was first brought to notice by the late Robt. Jack, of that place.

VARIETIES OF APPLES, NEW OR NOT WELL KNOWN IN ONTARIO AND QUEBEC.

For a number of years descriptions of apples have been published in the annual reports of the Horticulturist, most of which were of new or little known varieties. In a bulletin on Apple Culture, published this year, 53 kinds of apples were described, most of which were standard varieties. As there are so many new kinds continually appearing, it has been thought best to continue the work of describing the newer or not well known sorts.

Akin Red.—Fruit, oblate to roundish, slightly angular ; medium size ; cavity, medium depth to deep, open, sometimes irregular on one side ; stem, medium length, slender ; basin, medium depth and width, slightly wrinkled ; calyx, medium size, partly open ; colour, yellow, almost covered with bright rich red or crimson ; dots, numerous, yellow, district, not prominent ; skin, thin, moderately tough ; flesh, yellowish, crisp, juicy, very tender, melting ; core, medium ; mildly sub-acid, pleasant flavour ; quality, very good ; season, mid-winter to late winter. A very beautiful apple. Promising. Received from W. C. Reid, Belleville, Ont., and described January 8, 1901, also from W. H. Dempsey, Trenton, Ont., and described December 10, 1901.

Babbit.—Fruit, oblate, conic, angular, large ; cavity, deep, narrow, russetted ; stem, short, slender ; basin, narrow, medium depth, wrinkled ; calyx, medium size, open ; yellow, well washed and splashed with red with orange shade ; dots, few, yellow, distinct, but not prominent ; flesh, yellow, juicy, coarse, briskly sub-acid or acid, little character ; core, medium size ; quality, medium ; season, late winter. Grown at C. E. F.; described January 4, 1901.

Baraboo.—Fruit, roundish to oblate, large ; cavity, deep, narrow, slightly russetted, wrinkled ; stem, short, moderately stout ; basin, medium depth and width, slightly wrinkled ; calyx, closed ; pale greenish yellow, lightly splashed and streaked with bright purplish red (carmine) ; dots, fairly numerous, pale, indistinct ; skin, moderately thick, tender ; flesh, yellowish, crisp, juicy ; core, small ; briskly sub-acid ; quality, above medium ; season, early to mid-September. May be useful for season following Duchess, which it resembles somewhat. Grown at C. E. F. Described September 6, 1901.

Boiken.—Fruit, oblate, angular, large ; cavity, deep, open, slightly russetted at its base ; stem, short, slender ; basin, deep, medium width, slightly wrinkled ; calyx, large, open ; pale yellow with bright reddish pink blush ; dots, fairly numerous, distinct, prominent on blushed part ; skin, thick, tough ; flesh, yellowish, crisp, tender, juicy ; core, medium size, open ; briskly sub-acid, not high flavour ; quality, good ; season, late winter. Received from W. H. Dempsey, Trenton, Ont. Described December 8, 1900.

Downing's Winter Maiden's Blush.—Fruit, oblate, large ; cavity, medium depth and width ; stem, short, stout ; basin, deep, medium width, smooth ; calyx, closed ; yellow with a pink blush, handsome ; dots, moderately numerous, pale yellow ; skin, thick, tough ; flesh, yellowish, buttery, juicy ; core, medium size ; mildly sub-acid, pleasant flavour ; quality, good ; season, mid-winter. Received from W. H. Dempsey, Trenton, Ont. Described December 24, 1901.

Duffey's Seedling.—Fruit, oblong conical, above medium to medium ; cavity, medium depth, narrow ; stem, short, moderately stout ; basin, shallow to medium depth, medium width, wrinkled ; calyx, open ; yellow, well washed with deep red ; dots, fairly numerous, yellow, distinct, prominent ; skin, moderately thick, tender ; flesh, yellow, tender, rather coarse, moderately juicy ; core, medium size ; sub-acid,

peculiar flavour, spicey, not altogether pleasant ; quality, above medium ; season, late winter. A handsome apple and a good keeper. Received from W. H. Dempsey, Trenton, Ont. Described January 4, 1901.

Early Joe.—Fruit, oblate, medium size ; cavity, deep, open ; stem, short, stout ; basin, medium depth and width, smooth ; calyx closed ; yellow, well washed and splashed with bright red with a pink tinge ; dots, numerous, yellow, distinct, prominent ; skin, thin, tender; flesh, yellow, juicy, tender, melting ; core, small ; sub-acid, sprightly, pear-like, pleasant flavour ; quality, very good to best ; season, mid-September to late September. Specimens received from R. W. Shepherd, Como, Que. Described September 19, 1901. An old variety.

Edgehill.—Fruit, oblate, flattened, large to above medium size ; cavity, deep, medium width, russetted ; calyx, closed, or partly open ; stem, short, moderately stout ; basin, deep, open, to medium, almost smooth ; yellow, heavily splashed and washed with dark purplish red ; dots, yellow, moderately numerous, distinct ; skin, thick, tough ; flesh, white, tender, juicy ; core, small ; sub-acid, pleasant flavour, good ; quality, good ; season, early winter. This is a good dessert apple. The flavour is somewhat like St. Lawrence. Grown at C. E. F. Described November 11, 1901.

Fameuse Sucré.—Fruit, oblate, flattened, medium size ; cavity, open, deep ; stem, medium length, moderately stout ; basin, medium depth and width, wrinkled ; calyx, closed ; pale yellow almost entirely washed or splashed with crimson ; dots, moderately numerous, purple, indistinct ; skin, moderately thick, tough ; flesh, white, crisp, tender, juicy, Fameuse-like ; core, small ; mildly sub-acid, pleasant flavour ; quality, very good ; season, mid to late September. Very similar to Fameuse in character of flesh and somewhat in flavour. Colour of skin is also very similar to Fameuse. Specimens received from R. W. Shepherd, Como, Que. Described September 19, 1901. Mr. Shepherd is not certain whether this is true to name.

Hamilton.—Fruit, oblate, above medium to large ; cavity, deep, open, russetted ; stem, short, moderately stout ; basin, deep, open, slightly wrinkled, almost smooth ; calyx, open ; pale yellow with a pink blush ; dots, fairly numerous, indistinct ; skin, moderately thick, tender ; flesh, yellowish, tender, moderately juicy ; core, small ; sub-acid, pleasant flavour ; quality, good or almost good ; season, late October, November. Not attractive enough looking to be very promising. Grown at C. E. F. Described November 8, 1901.

Horn.—Fruit, roundish, below medium size ; cavity, medium depth and width ; stem, medium length, slender ; basin, shallow, open, almost smooth ; calyx, medium size, closed, or partly open ; skin, yellow, almost covered with deep crimson ; dots, fairly numerous, medium size, yellow, conspicuous ; skin, moderately thick, tough ; flesh, yellow, tinged with red, juicy, very tender ; core, medium ; sub-acid, medium ; quality, good ; season, early winter. A very handsome apple. Received from W. H. Dempsey, Trenton, Ont. Described November 10, 1900.

Jefferis.—Fruit, oblate, size, medium to above ; cavity, deep, open, slightly russetted ; stem, very short, slender ; basin, deep, open, smooth; calyx, open ; pale yellow splashed and washed with crimson ; dots, fairly numerous, yellow, distinct ; skin, moderately thick, moderately tender ; flesh, yellowish, tender, melting, juicy ; core, small ; mildly sub-acid, pleasant flavour, good ; quality, very good ; season, September to mid-October. A fine dessert apple. Received from W. H. Dempsey, Trenton, Ont. Described November 2, 1901. An old variety.

Kinnaird.—Fruit, roundish, prominently angular, above medium size ; cavity, medium depth and width ; stem, short, stout ; basin, medium depth and width, wrinkled ; calyx, medium size, open ; greenish yellow, well washed and splashed with

deep, dull red ; dots, few, obscure ; skin, thick, tough ; flesh, yellow, crisp, tender, moderately juicy ; core, small ; sub-acid, pleasant flavour ; quality, good ; season, mid-winter to late winter. Grown at C.E.F. Described January 8, 1901.

Rochelle.—Originated with R. W. Shepherd, Como, P.Q. Fruit, roundish, obtusely conical, large ; cavity, deep, medium width ; stem, short, moderately stout ; basin, deep, medium width ; calyx, open ; colour, yellow, well splashed and washed with bright purplish red ; dots, fairly numerous, yellow, distinct, but not prominent ; skin, moderately thick, moderately tender ; flesh, yellowish, crisp, firm, juicy ; core, small to medium ; sub-acid, pleasant flavour ; quality, good ; season, early to near mid-winter. A large, handsome apple. Specimens from W. H. Dempsey, Trenton, Ont., and from R. W. Shepherd, Como, P.Q. Described November 27, 1901. For further information regarding the origin of this variety, see report of the Horticulturist for 1896, where it is already described.

Milding.—Fruit, oblate, large ; cavity, medium depth and width, russetted ; stem, short, stout ; basin, medium depth, open, almost smooth ; calyx, open ; greenish yellow, splashed and washed with purplish red mostly on sunny side ; dots, few, small, yellow, indistinct ; skin, thick, tough ; flesh, yellowish, crisp, juicy ; core, medium size, open ; sub-acid, pleasant flavour ; quality, good ; season, early winter. Received from W. H. Dempsey, Trenton, Ont. Described November 18, 1901.

Missouri Pippin.—Originated in Missouri. Fruit, roundish conic, somewhat angular, medium size ; cavity, deep, medium width ; stem, short, slender ; basin, narrow, medium depth, wrinkled ; calyx, small, partly open ; yellow, well splashed and washed with dep red ; dots, fairly numerous, small, yellow, distinct ; skin, thick, tough ; flesh, yellowish, crisp, moderately juicy, rather coarse ; core, small ; sub-acid, pleasant flavour ; quality, good ; season, late winter. Grown at C.E.F. Described December 24, 1901. A hardy variety which may prove useful in this country.

Okabena.—Fruit, oblate, above medium size ; cavity, deep, moderately open to open ; stem, short, to medium, moderately stout ; ; basin, deep, medium width, slightly wrinkled ; calyx, open ; greenish yellow, streaked, splashed and washed with purplish red mostly on sunny side ; dots, few, obscure ; skin, moderately thick, moderately tough ; flesh, yellowish, crisp, tender, rather coarse, juicy ; core, small ; briskly sub-acid ; quality, above medium ; season, late September to early October. Resembles Duchess somewhat in appearance and quality, but is a more oblate apple than Duchess. Grown at C.E.F. Described October 3, 1901.

Palouse.—Originated in Washington Territory. Fruit, roundish to oblate, above medium size ; cavity, deep, open ; stem, medium length, slender ; basin deep, medium width, smooth ; calyx, open ; yellow, well splashed and washed with deep orange red ; dots, fairly numerous, yellow, distinct ; skin, moderately thick, moderately tender ; flesh, yellow, crisp, juicy ; core, medium ; briskly sub-acid, sprightly ; quality, almost good ; season, early to mid-winter. A handsome apple. Flesh not fine grained enough to make a good dessert fruit. Received from W. H. Dempsey, Trenton, Ont. Described November 12, 1901.

Parlin's Beauty.—Fruit, roundish, ribbed (but not prominently), large ; cavity, deep, medium width, russetted ; stem, short, slender ; basin, deep, narrow ; calyx, small, closed ; pale yellow, splashed and washed with bright red, mostly on sunny side ; dots, few, pale yellow, distinct ; bloom, slight ; skin, moderately thick, tough ; flesh, white, juicy, very tender, melting ; core, small ; sub-acid, pleasant but not high flavour ; quality, very good ; season, November. This is a very handsome apple and promising for its season. Received from W. H. Dempsey, Trenton, Ont. Described November 5, 1900.

Patten's Duchess.—Fruit, oblate, above medium size ; cavity, deep, medium width, slightly russetted ; stem, short, slender to moderately stout ; basin, deep, open, slightly wrinkled ; calyx, closed ; colour, greenish yellow, splashed and washed with orange red, mostly on sunny side ; dots, few, large, white, prominent ; bloom, slight ; skin, moderately thick, moderately tender ; flesh, white, crisp, moderately juicy ; core, small ; sub-acid ; quality, above medium ; season, October. Not desirable in this district, as it is not as good as Wealthy. It is a handsome apple. Grown at C.E.F. Described October 15, 1901.

Patten's Greening.—Fruit, oblate, large ; cavity, deep, medium width, russetted ; stem, short ; basin, deep, medium width ; calyx, open, large ; pale yellow with traces of pale green, with a pink blush ; dots, moderately numerous, pale green, distinct ; bloom, slight ; skin, moderately thick ; flesh, yellow, juicy, tender, coarse ; core, small ; sub-acid ; quality, above medium ; season, October to mid-November. Grown at C.E.F. Described October 18, 1901.

Switzer.—Fruit, roundish to oblate, medium size ; cavity, narrow to medium, medium depth ; stem, short to medium, moderately stout ; basin, shallow, medium width, wrinkled ; calyx, closed ; pale yellow, almost white, well washed with bright red ; dots, few, pale, distinct, but not prominent ; bloom, slight ; skin, moderately thick, moderately tender ; flesh, white, crisp, tender, juicy ; core, small ; sub-acid, pleasant flavour ; quality, very good ; season, late August to early September. Not unlike Lowland Raspberry in many respects, but its season is later, and it is more acid, and the flesh is not as melting. Fruit is also not blotched with bright red. Promising. Grown at C.E.F. Described September 3, 1901.

Utter's Red.—Fruit, roundish, large ; cavity, deep, open ; stem, short, moderately stout ; basin, open, medium depth, wrinkled ; calyx, open or closed ; pale yellow, splashed and streaked with bright carmine, mostly on sunny side ; dots, few, indistinct ; skin, thick ; flesh, yellowish, crisp, tender, rather coarse, juicy ; core, medium size ; mildly sub-acid, pleasant flavour ; quality, good ; season, early to mid-winter. Too coarse an apple for a good dessert fruit. Received from W. H. Dempsey, Trenton, Ont. Described November 14, 1901.

Winter Banana.—Fruit, roundish, angular, medium size ; cavity, medium depth, open, slightly russetted ; stem, short, stout ; basin, shallow, open, slightly wrinkled ; calyx, open ; yellow, with a deep red blush ; dots, pale, obscure ; skin, thin, tender ; flesh, yellow, crisp, tender, juicy ; core, medium size, open ; mildly sub-acid, sprightly, good ; quality, very good ; season, mid-winter. Received from W. H. Dempsey, Trenton, Ont. Described January 5, 1901.

PEARS.

Many of the trees in the pear orchard were killed by blight in 1900 and others were badly injured, and although the disease was not as prevalent this year, trees which looked in fairly good health last autumn died in the spring, and it was found that they had been affected the previous year, though the disease had not shown. The only tree which fruited this year was a Bessemianka, which produced a few pears. A number of seedlings of the best varieties are being raised, and it is possible that something which is comparatively blight proof may be originated.

Following is a description of a seedling pear received from E. C. Beman, Newcastle, Ont. :—

No. 218.—E. C. Beman, Newcastle, Ont. Pear seedling.—Large, roundish to obovate, obtuse pyriform ; skin, greenish yellow with a faint bronze tinge on sunny side ; dots, numerous, russet, prominent ; stem, long, stout ; cavity, shallow, open ;

basin, medium depth and width, smooth ; flesh, yellowish, juicy, sweet, tender, melting ; core, small ; quality, good ; season, late October. Promising.

PLUMS.

There was little injury to the plum orchard by winter this year, as far as the wood of the trees was concerned, but the flower buds on the European varieties were all killed, there not being a single fruit of this type of plum. There were a few plums of the Japanese variety known as Botan, but this is of little value here. Some of the Miner type of plums yielded fairly well, but these seldom fruit heavily here. The Americana and Nigra varieties blossomed abundantly, and a number of kinds fruited heavily, but the crop was not an average one on these trees, as the weather during the blossoming season was wet and unfavourable for proper pollination.

There is no doubt that in the Ottawa district, and where the climate is similar, the main dependence must be on the Americana and Nigra plums. These varieties, though not equalling the European plums in richness and tenderness of skin, afford good substitutes where better kinds cannot be grown successfully. The Nigra, or native plum, is thinner in the skin than the Americana, but not as rich. The fruit is also usually badly affected by blight (*Cladosporium carpophilum,* V. Thumen), and unless thoroughly sprayed does not mature, the blight affecting it when it is nearly full grown, causing it to wither and fall to the ground before maturing. The Nigra plum is also more affected by curculio than the Americana, which lessens the crop very much.

The Americana plum is a heavy bearer of handsome plums which, though, as a rule, thick skinned, are handsome and of good quality, though sometimes astringent. During the past few years there have been many named varieties offered for sale and some of these are very good indeed, being much larger and richer than the older sorts.

This year, when there was an abundance of European plums on the market from Western Ontario, the Americana plums, grown at the Farm, sold readily for 50 cents per 12-lb. basket. A tree of Bixby plum, planted in 1893, gave a yield of 11½ gallons, which, at 50 cents for 12-lb. basket was $2.87 worth of fruit from that tree, and in a good season the yield would be much more. The following quotation from a recent letter received from Mr. Alex. Stewart, Hull, Que., a prominent fruit-grower in this vicinity, is evidence as to the esteem with which these plums are held by other growers. He writes :—'I have not fruited a very great number of Americana plums as yet, as my orchard is young, but I am very proud of some of those that I have fruited. Their hardiness, fine appearance, and good quality make them of great value to the fruit grower of Eastern Ontario, and the Ottawa Valley in particular. The best five I have fruited so far are as follows :—Hawkeye, Stoddard, Wolf, DeSoto, Wyant.

'I sold my plums in 10-lb. grape baskets at 40 cents per basket ; 20-lb. baskets of western plums sold for 65 cents per basket at the same time. People will pay a third more for the local fruit. I took eleven 10-lb. baskets of Hawkeye off one tree five years planted. That will pay well. There will be quite a few plums planted about Ottawa next spring. I have given lists of the best varieties to a number of people. In five years from now we will see some good plums about Ottawa, and we may thank the Experimental Farm for their introduction.'

Mr. H. C. Carstesen, Billings Bridge, Ont., who makes a specialty of the native plum, *Prunus nigra,* has also kindly furnished me with some information regarding his success with them. Mr. Carstesen's trees are practically all seedlings of his own raising, some being much better than others. The soil in which they are growing is a heavy clay loam. The trees are kept thoroughly sprayed with Bordeaux mixture to prevent blight. Mr. Carstesen now has between 300 and 400 trees in his orchard, but many of these are young. Some of his trees have yielded from four to five 10-quart

pails each. The following are some figures furnished by Mr. Carstesen of some of his sales.

1898, 79 pails, averaging 80 cents per pail.
1899, 71 pails, averaging 93 cents per pail.
1900, 177 pails, averaging 87 cents per pail.
1901, 149 pails, averaging 82 cents per pail.

Some of the best of the plums sold as high as $1 per pail. Mr. Carstesen could not obtain these prices if it were not that his plums are very early, as they begin to ripen the first week of August and come on the market when there is little competition with other plums. He says that he cannot supply the demand for them.

The following extracts from a letter received from Mr. C. H. Snow, Cummings Bridge, Ont., show that all growers are not favourably impressed with these plums :—

'I cannot give you any encouragement so far as these American plums are concerned. The older the trees grow, the more rotten and miserable they look, and it would take a man doing nothing else but bolting and propping them up. Where-ever there is a crotch limb, down it comes by its own weight only. The recent sleet and rain that formed on the trees about 10 days ago pretty nearly finished the best of mine ; in fact, some of the trees of DeSoto will break off at the stump like a clay pipe.

'Now, for the fruit. The astringency in the skin shows up remarkably well when preserved. You should be at the table sometimes and hear the remarks of my children when my wife brings out some Hawkeye plum preserve. There are plenty of our old Canadian plums better for preserves, and if the people would only spray them they would be all right, and so far as selling, they bring a better price per pail, coming in, as they do, the first week in August, before the *Prunus domestica* class are shipped in here. This lateness in ripening is a great drawback. It brings them in straight competition with Lombard, Damsons, Yellow Eggs, and Gages, when sold this year the complaint was that the women folks found the skin too thick. The price paid me for a 2-gallon basket, nearly a pail, was 35 cents. Some of my neighbours got 75 cents and $1 for common wild plums. Still, the price is all right and would pay at this figure if one could sell a large quantity, but the competition is too keen from a much better source, viz. : the European varieties. The varieties so far fruited with me are : Stoddard, Rockford, DeSoto, Hawkeye, Wolf, Weaver, 2 kinds, Black Hawk ; the best of these are Stoddard, Hawkeye, and Wolf.'

It is very true, as Mr. Snow writes, that the trees split easily, and this is a drawback to the Americana varieties which the Nigras or native plums do not suffer from, but if the present market for these plums continues, paying crops will be obtained before the trees are too badly split to produce fruit, and as the trees begin to bear when young they may be replaced. The skin of the Nigra, or Canadian wild plum, breaks up easier in canning and preserving than the Americana, but they are not as rich. The Cheney is one of the best of these. Many of the Americana plums are but slightly astringent when preserved. Hawkeye is one of the poorest for this purpose.

The following recipes for canning and preserving Americana plums, published by Prof. E. S. Goff, in bulletin No. 87, of the Wisconsin Agricultural Experiment Station, Madison, Wis., will prove helpful to those who have not found the plums preserve well :—

'The native plums, especially those with firm pulp, after being treated by any of the methods mentioned below, are well adapted to all purposes for which the foreign plums are used. As a rule, more sugar is required for the native plums, but the preparations are rich in proportion. The harshness in the skin and stone of some native plums is readily removed by steaming them in an ordinary cooking steamer until the skin cracks ; or pour over them boiling water to which has been added common baking soda in the proportion of half a teaspoonful to a quart. The thicker-skinned

varieties may be readily peeled by placing them in boiling water two or three minutes. The recipes follow :—

'*Canning.*—Pick the fruit when well coloured but a little hard, steam or cook in a porcelain-lined kettle until tender, put in cans that have first been treated to boiling water, and cover with boiling syrup made of equal parts of granulated sugar and water, filling the can to the top ; then run a silver knife around the can inside and let out the air, and seal at once. Plums cooked in the syrup are likely to be tough. Canned plums may be used for pies and for mixing with or flavouring other fruits. Plums are often canned without sugar to be used in winter for making fresh plum butter. The juice of canned plums makes excellent jelly.' One lady recommends splitting native plums to the stone on one side before cooking, to avoid crumbling.

'*Drying.*—DeSoto, Wyant and doubtless other varieties may be pared, pitted, and spread on plates, lightly sprinkled with sugar and dried, first in the oven and later in the sun. Cook like dried peaches.

'*Plum Jelly.*—The fruit should be gathered when only part ripe—about half coloured. This point is very essential. Put plums in a large granite or porcelain kettle—the latter is best—with barely enough water to cover them. Cook until tender, but not until they are in a pulpy mass. Having previously covered a large jar with a cloth, strain the fruit in and let the juice drop through, but do not squeeze. When all has drained through, strain once or twice more through another cloth, until the juice is perfectly clear. To one measure of juice provide one measure of granulated sugar, but do not put together at once. A very important point in the making of all jelly is that only a small quantity should be cooked at one time. Into a medium sized kettle put, say, four tumblers of juice ; let it boil briskly 15 or 20 minutes, then add the four tumblers of sugar, and in a very short time—usually from three to ten minutes—the jelly will be finished, light, clear and delicious. To test the jelly, dip a spoon into the boiling juice and sugar and hold it up ; when the jelly clings to the spoon in thick drops, take it off quickly and put into jelly glasses. The plum pulp which is left can be put through a cullender and used for plum butter.'

'Another recipe :—*Plum Preserves.*—Take equal weights of fruit and sugar ; place in stone jar a layer of fruit, then a layer of sugar—alternating thus until quantity desired is reached. Let stand over night ; in the morning drain off the syrup that will have formed into a porcelain-lined kettle, place same over the fire and let syrup come to a boil ; then pour it over fruit in jar again ; repeat this every day until the fourth heating, when fruit and syrup are both put in kettle and boiled for a few minutes. Place same in glass jars while hot, seal and put away in some cool and preferably dark place.

'Still another recipe.—To each pound of plums add a pound of sugar ; put the fruit into boiling water until the skins will slip ; peel and sprinkle sugar upon each layer of fruit in a bowl, allowing them to stand over night ; then pour off the juice, bring quickly to a boil, skim and add the plums ; cook very slowly till tender and clear, which will take about one-half hour ; take them out carefully and put into a pan ; boil the syrup for a few minutes longer until it thickens ; pour it over the fruit; seal or tie them up.'

A better plum for this part of Canada will probably be obtained by crossing the Nigra with the Americana, as it is possible that a variety may be originated which will have the tough tree of the Nigra and the thinner skinned fruit of that species with the productiveness and freedom from disease of the Americana and the quality of that species.

The trees at the Experimental Farm are ten feet apart in the rows, the rows being 20 feet apart ; this greater distance being required in order that the trees may be thoroughly sprayed. Ten feet is a little too close in the rows, as the trees are already

interlacing, but this could not very well be avoided, as the original trees were planted 20 by 20 feet apart and the additional trees set half way between. A satisfactory distance would be about 15 feet apart each way, which would permit of thorough spraying for a long time. The trees, which are rather easily broken and split on account of the heavy crop they bear and the great growth they make when young, are better protected than if they were planted further apart.

In the report of the Horticulturist for 1900, a descriptive list was published of 13 of the best varieties of Nigra and Americana plums which had fruited at Ottawa, covering a season from August 24 to September 25. No new named varieties of special merit fruited this year, but among the young trees are a number of kinds which are spoken very highly of by those who have seen the fruit.

Seedling Plums.—Many seedling plums are being grown at the Experimental Farm, and a number of the Americana seedlings have already fruited. This year 54 trees bore, consisting of 12 Wolf, 7 Yosemite Purple, 6 Speer, 6 Weaver, 12 DeSoto, and 11 Rollingstone seedlings. Of these there were only three which were considered equal or superior to the best named varieties under test. These have been named and are herewith described :—

DON, *Wolf seedling.*—Planted in orchard, fall of 1895 ; tree hardy and vigorous ; fruit large, roundish ; suture a distinct line, not depressed ; colour uniformly deep, lively red all over ; dots numerous, small, yellow, distinct ; bloom moderately heavy ; flesh deep yellow, juicy, firm, with a sweet, rich flavour ; skin thick, and tough ; stone medium size, oval, somewhat flattened, cling ; quality, very good. Ripe September 28, 1901, and September 27, 1900. Thought to be the best late Americana plum yet fruited here.

CARO, *Wolf seedling.*—Planted in orchard fall of 1895 ; tree hardy and vigorous ; fruit very large, roundish ; suture fairly distinct, not depressed ; colour bright red, showing yellow in patches ; dots numerous, yellow, distinct ; bloom light ; flesh deep yellow, juicy, with a sweet, rich flavour ; skin thick, moderately tender ; stone large with an oval outline, but considerably flattened. Ripe September 6, 1901, and September 10, 1900. More attractive than Wolf and better in quality.

BOUNCER, *Yosemite Purple seedling.*—Planted in orchard fall of 1895 ; tree hardy and vigorous ; fruit very large, roundish ; suture a distinct line, not depressed ; colour a uniformly deep purplish red all over ; dots numerous, yellow, distinct ; bloom moderately heavy ; flesh deep yellow, juicy, with a sweet, rich flavour ; skin thick and tough ; stone large, flat, cling ; quality very good. Ripe September 10, 1901, and September 22, 1900.

A promising seedling plum of the *domestica* group named Amaryllis (No. 219) was received from Mr. Aug. Dupuis, Village des Aulnais, P.Q. It was a medium sized yellow plum of very good quality.

CHERRIES.

The cherry crop was a failure this year, the flower buds having been killed by winter. There has not been a full crop of cherries here since 1898, so that although the stocks and wood are hardy, the winters, as a rule, appear too severe for the fruit buds. The wood of the Morello cherries wintered well, as usual, but the Bigarreau, which are tender here, were killed nearly to the ground. The Dukes were not quite so badly affected, although they were much injured. The trees made good growth this year.

GRAPES.

The grape vines were uncovered on May 8, and it was found that they had wintered well. There was a fine show of bloom at blossoming time and it was thought that the crop would be a heavy one, but the wet weather which set in was very un-

favourable for pollination, the result being that there was only about half a crop on most varieties. The season was favourable for the maturing of the fruit, and 115 varieties ripened, although some of them were late in doing so, as the weather was not warm enough for rapid ripening. The vines were thoroughly sprayed with Bordeaux mixture during the growing season, and there was little disease of any kind.

The system of pruning and training now adopted is thought to be one of the most satisfactory where grapes are grown for dessert purposes and for home use, where the vines have to be protected. The system is a modification of that known as the High Renewal.

When a young vine is planted in the spring it is cut back to near the ground and after making the season's growth it is again cut back to one stem about 18 inches from the ground. Two canes only are allowed to grow during the second season, and when long enough these should be tied to the lowest wire, which should be from 18 inches to 24 inches above the ground. In the autumn the canes are bent down and covered with soil to protect the vine during the winter, the main stem also being covered. In the spring the canes or arms are spread out in opposite directions and tied along the lower wire, and three new wires should now be added 18 inches apart. This year being the third, there will be canes grow upwards from the buds along the outstretched arms, and a little fruit may set. During the growing season, laterals or side shoots should be pinched out. In the autumn of the third year the canes which have grown upright should be cut back to near the arms, leaving only one bud on each, in addition to the bud at its base, on the arm. The arms should, at the same time, be cut back until there are from 40 to 50 buds left in all, from which fruiting wood will grow during the fourth year. In the High Renewal system, provision is made for the replacing of the arms every year by new ones, by leaving two additional stubs on the main stem from which new canes grow and which replace the two arms. In this system the arms are never more than one year old. The system adopted at the Experimental Farm is between this and the horizontal arm system, where the arms are left for a number of years. It is found that if the arms are left permanently they will get stiff and are difficult to bend down and cover with soil, and in the High Renewal system there is danger of breaking one year old canes, and also danger from winter killing, in either of which cases the crop would be lost. Better results can be obtained by having the arms at least two years old, but not more than four, and they may be renewed in alternate years. The amount of wood left on the vines must be regulated by the earliness, productiveness and vigour of the variety. In most cases, 40 to 50 buds are sufficient to leave ; as a medium crop of well-grown, well-ripened grapes is better than a large crop of inferior fruit. By having the crop as near the ground as possible without the fruit being injured by the soil, the grapes will ripen better than if higher up, on account of the reflection of heat from the ground. When the vines are in full bearing, as they are in the fourth year, considerable pruning is necessary during the growing season. The vines are uncovered as soon as there is no further danger of severe frost and before the buds have swollen, about May 7 being the average time. The arms are then tied to the lower wire. In about a month afterwards it will be necessary to go through and tie the young shoots to the second wire and to pinch out unnecessary shoots, such as suckers and laterals. In about a week more they should be tied again and the laterals and suckers removed. Another pruning is necessary after the vines have grown above the top wire, when they are pinched back to that wire, and any other unnecessary shoots pinched out as before.

In the report of the Horticulturist for 1900, a list was published of the twenty-five earliest varieties which had fruited here, with descriptions and notes as to quality and dates of ripening, as the early varieties are the most useful in the colder parts of Canada. New kinds are continually being tested, in order to find out whether there are any others which are as early, and also to test their quality and productiveness. A large number of varieties recently planted were originated by T. V. Munson, of Texas, from whom they were procured.

Varieties of grapes planted in 1900 and 1901.—Atoka, Campbell's Early, Coleraine, Delago, Delawba, Early Daisy, Hosford, Lucile, Lukfata, Lutie, McPike, Manito, Marvina, Mills No. 9, Nectar, Norfolk, Presly, Storr's Early, Wapanuka, Yomago.—20 varieties.

RASPBERRIES.

The season of 1901 was very unfavourable for raspberries in this district. Owing to severe weather the canes were badly winter-killed; the Cuthbert, which is the principal variety planted, being so much injured that there was practically no fruit of that variety. Golden Queen appeared to be the tenderest, as there was not a cane left of this variety. A seedling originated by Mr. R. B. Whyte, Ottawa, Ont., now called Herbert, was quite hardy and it yielded the best at the farm this year. At the Experimental Farm the canes were bent down as usual, but it appeared to have no beneficial effect. In the following table the yields for both 1900 and 1901 are given. The yields this year show the relative hardiness of the varieties rather than their productiveness, some kinds not producing any fruit, and others very little.

RASPBERRIES—TEST OF VARIETIES.

Name of Variety.	Date of First Ripe Fruit.		Date of First Picking.		Date of Last Picking.		No. of Pickings.		Total Yield.				Length of Row.
	1900.	1901.	1900.	1901.	1900.	1901.	1900	1901	1900.		1901.		
Red Varieties.									Lbs.	Oz.	Lbs.	Oz.	Ft.
Kenyon	July 14	July 9	July 16	July 12	Aug. 13	July 30	12	7	32	2	3	1	36
Henry	" 4	" 5	" 13	" 9	" 6	" 18	11	3	28	1	0	15	36
Brighton	" 7	" 5	" 13	" 9	" 9	" 22	10	5	27	2	4	13	36
Clarke	" 11	" 6	" 13	" 9	" 13	Aug. 2	13	9	26	15	5	11½	36
Count	" 7	" 5	" 13	" 9	" 9	July 22	12	5	26	13	5	3	36
Marlboro	" 9	" 6	" 13	" 9	" 13	" 30	13	7	24	9	6	6½	36
Muriel	" 8	" 6	" 13	" 9	" 9	" 22	11	4	22	10	0	12	36
Phoenix	" 9	" 13	" 16	" 15	" 17	Aug. 6	13	8	21	0	9	1½	36
Boyle	" 9	" 6	" 16	" 9	" 9	July 24	10	6	20	1	3	8	36
Red Antwerp	" 11	" 6	" 13	" 9	" 9	" 22	11	5	16	12	2	12¼	36
Turner	" 11	" 9	" 13	" 12	" 13	Aug. 2	13	7	16	7	3	14	36
Dora	" 11	" 6	" 13	" 9	" 13	" 6	12	8	15	14	5	5	36
Reliance	" 7	" 6	" 13	" 9	" 13	July 30	13	8	15	13	2	6	36
Cassel	" 12	" 10	" 18	" 12	" 13	" 27	9	6	15	2	2	7	36
Garfield	" 11	" 7	" 16	" 9	" 13	" 22	12	5	15	2	3	11½	36
Lorne	" 7	" 6	" 13	" 9	" 13	" 15	12	3	14	11	1	8	36
Cardwell	" 10	" 10	" 16	" 12	" 9	" 27	10	6	14	11	2	10½	36
Nelson	" 11	" 6	" 13	" 9	" 9	" 15	11	3	14	3	1	2	36
Trusty	" 6	" 6	" 13	" 9	" 13	Aug. 2	12	9	13	7	3	4	36
Alma	" 11	" 6	" 13	" 12	" 13	July 22	12	4	12	15	1	8½	36
Thompson's E'ly Prolific	" 9	" 10	" 13	" 12	" 13	" 30	13	3	12	10	0	4	36
Hornet	" 11	" 6	" 16	" 9	" 13	" 30	11	7	12	5	2	2½	36
Cardinal	" 12	" 9	" 20	" 12	" 13	Aug. 2	9	8	12	4	12	7	36
King	" 7	" 6	" 13	" 9	" 17	" 2	14	9	11	3	6	0½	36
Craig	" 12	" 6	" 16	" 9	" 13	July 22	12	5	10	11	1	14¾	36
Cuthbert	" 15	....	" 20	....	" 17	....	11	....	10	11	.....		36
Loudon	" 12	July 12	" 16	July 12	" 17	July 30	13	7	10	10	2	6½	36
Hansell	" 6	" 6	" 13	" 9	" 13	" 22	13	5	10	9	1	2½	36
Heebner	" 12	....	" 18	....	" 13	....	11	....	10	6	.....		36
Herstine	" 12	July 20	" 18	July 22	" 9	Aug. 2	8	3	8	7	0	7	36
Biggar's Seedling	" 13	" 9	" 18	" 12	" 13	July 30	11	7	8	5	3	7½	36
Fontenay	" 12	....	" 16	....	" 17	....	11	...	7	5	.....		36
Miller's Seedling	" 9	July 16	" 13	July 18	" 13	July 22	13	2	7	1	0	4	36
Gladstone	" 7	....	" 13	....	" 27	....	6	....	6	9	.....		36
Deacon	" 12	July 6	" 18	July 9	" 9	July 18	9	4	5	10	1	11	36
Herbert	" 12	" 9	" 18	" 12	" 1	Aug. 6	5	9	5	6	17	2	36
Sir John	" 7	....	" 16	....	" 6	....	7	....	4	12	...		36
Baumforth	" 9	July 5	" 13	July 9	" 6	Aug. 2	5	9	2	10	1	10½	36
Empire	" 6	" 6	" 13	" 9	July 18	July 15	3	3	2	9	0	6	36
Mary	" 16	" 6	" 18	" 9	" 25	" 15	4	3	2	5	0	12	36
Hiram	....	" 10	....	" 12	....	Aug. 6	...	9	.....		4	13¼	36
Sarah	....	" 20	....	" 22	....	" 6	....	6	....		2	10	36
Magnum Bonum	....	" 6	....	" 9	....	July 24	....	5	.....		1	11	36
Knevett's	....	" 6	....	" 9	....	" 12	....	2	.....		0	6	36

RASPBERRIES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of First Ripe Fruit.		Date of First Picking.		Date of Last Picking.		No. of Pickings.		Total Yield.				Length of Row.
	1900.	1901.	1900.	1901.	1900.	1901.	1900	1901	1900.		1901.		
									Lbs.	Ozs.	Lbs.	Ozs.	Ft.
Yellow Varieties.													
Caroline	July 16	July 9	July 20	July 15	Aug. 16	Aug. 6	11	8	16	1	6	0	36
Yellow Antwerp	″ 12	″ 10	″ 16	″ 12	″ 9	″ 6	8	7	11	4	1	9½	36
Golden Queen	″ 16	....	″ 23	....	″ 13	....	9	....	8	1	..	..	36
Champlain	″ 11	....	″ 16	....	″ 3	....	8	....	4	14	.	....	36
Lady Anne	″ 12	July 6	″ 16	July 9	July 27	July 15	4	3	3	14	0	8	36
Purple Varieties.													
Shinn	July 12	July 9	July 13	July 9	Aug. 13	Aug. 6	13	10	27	8	16	12½	36
Duncan	″ 14	″ 10	″ 18	″ 12	″ 13	″ 6	10	8	18	15	4	13½	36
Shaffer	″ 12	″ 12	″ 20	″ 15	″ 13	″ 2	10	7	11	10	8	1	36
Ralph	″ 16	″ 16	″ 20	″ 18	″ 9	July 22	8	2	8	7	0	4	36
Percy	″ 10	″ 9	″ 16	″ 12	″ 6	Aug. 2	9	8	8	2	6	0½	36
Columbian	″ 18	″ 16	″ 23	″ 18	″ 13	″ 6	9	7	7	7	10	2½	36

RASPBERRIES GROWN IN LARGER PLOTS.

Cuthbert (red)	....	... ...	July 18	July 18	Aug. 16	Aug. 6	12	6	92	7	7	0	236
Sarah ″	....	....	″ 20	″ 22	″ 13	″ 6	9	6	67	7	23	11	236
Heebner ″	....	....	″ 18	....	″ 16	....	12	....	43	2	......		236
Golden Queen (yellow)	....	....	″ 20	....	″ 16	....	11	....	45	8	......		236
Progress (black cap)	....	....	″ 14	July 9	″ 13	July 22	11	5	84	5	33	13	236
Hilborn ″	....	....	″ 18	″ 12	″ 13	″ 24	12	5	71	14	31	7	236
Older ″	....	....	″ 15	″ 12	″ 9	″ 22	10	4	47	3	25	1	236
Shaffer (purple raspberry)	....	....	″ 18	″ 12	″ 16	Aug. 2	12	8	72	12	72	7½	236

STRAWBERRIES.

The strawberries wintered well this year and the prospects for a heavy crop were good, but during the ripening season there was very hot, dry weather which reduced the yield, although the crop on the whole was good. The advantage of thick foliage was very apparent this year, as such thin foliaged varieties as Clyde, though promising a large crop, had their fruit badly scalded and withered up. While varieties with thick foliage did not suffer nearly so much.

There were 350 varieties in the plantation, but of these 167 had been marked to discard in 1900, and the yields of them are not given. A new plantation was made in the spring of this year containing 218 varieties for comparison of yields and quality. In addition to these, three plants each of those which had been discarded, were planted, in order to keep in touch with them. No fruit was allowed to ripen on the new plantation this year.

In the following table will be found the yields of those varieties not discarded in 1900 with the yields for 1900 and 1901, and the average yields for the two years. In addition to this, other useful data are given regarding the different kinds. The crop recorded is from two rows each 15 feet in length. The rows were planted 3½ feet apart and the plants 15 inches apart in the rows. In 1899, when the plantation was made, the runners were kept pinched off until July, and in the spring of 1900 each row was cut back to 2 feet in width where necessary, and in the spring of 1901 the rows were again cut back to 2 feet. It is interesting to note that some kinds yielded better the first year than the second, one reason being that the varieties which make many runners are crowded the second season. On the other hand, some kinds which make few runners the first year yield better the second season when there are

more of them. The character of the season would also influence the yield. On the whole, the best practice is to take only one crop off, letting the runners start in time to get a good stand the year the plantation is made.

The names of the varieties in the table are in descending order of merit according to the yield of 1901. By examining the table it will be found that the six best yielding varieties, taking the average of 1900 and 1901, are Mele, Daisy, Buster, Howard's No. 41, Glen Mary, and Afton, all of which were described in the report for 1900, except Mele, which is a pale, soft berry of only medium quality and not recommended. In the table the letter P. stands for pistillate, or imperfect flowers, and B. for bisexual, or perfect flowers.

Name.	Bi-sexual, Pistillate.	Date of full bloom.		Date of first ripe fruit.		Date of first picking.		Date of last picking.		Number of pickings.	Weight of 25 average berries.	Total yield, 1900.		Total yield, 1901.		Average yield, 1900 and 1901.	
											Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Greenville	P	May	29	June	22	June	24	July	9	5	6½	10	11	35	11½	23	3¼
Mele	P	″	28	″	19	″	20	″	7	6	5½	22	3½	34	5	28	4¼
Bisel	P	″	28	″	18	″	19	″	12	7	6¼	8	11¼	33	3½	20	15⅜
Sample	P	″	29	″	20	″	21	″	12	7	7½	....		30	15		
Buster	P	″	29	″	22	″	25	″	9	5	8¼	20	8¾	30	12½	25	10⅝
Carrie	P	″	27	″	20	″	21	″	9	6	7½	5	9	29	15	17	12
Arkansas Traveller	B	″	28	″	18	″	20	″	7	6	5	9	10	29	10	19	10
Bubach	P	″	29	″	18	″	21	″	9	6	9¼	4	5	29	5¼	16	13⅛
Enhance	B	″	27	″	24	″	26	″	12	4	7	16	4	29	5	22	12½
World's Champion	B	″	28	″	22	″	24	″	8	5	5¼	7	2	29	2	18	2
Glen Mary	B	″	25	″	19	″	21	″	9	7	8	18	12	28	12¼	23	12⅛
Perfection	P	″	27	″	20	″	24	″	9	4	7¼	11	4¼	28	5	19	12⅝
Lloyd's Favorite	P	″	28	″	19	″	20	″	8	6	7½	6	0	26	10	16	5
Dora	P	″	29	″	20	″	24	″	12	6	6¼	15	4½	26	9¼	20	14⅞
Vories	B	″	29	″	22	″	24	″	8	5	5½	1	9	26	8½	14	0¾
Williams	B	″	28	″	21	″	24	″	5	5	6	15	7	26	4	20	13½
Beder Wood	B	″	23	″	17	″	19	″	5	6	7¼	7	13	25	5	16	9
Cole's Seedling	B	″	29	″	22	″	26	″	12	5	6½	....		25	0		
Howard's 41	P	″	27	″	18	″	21	″	9	6	6	25	2½	24	5½	24	12
Kyle	B	″	22	″	17	″	20	″	3	5	7	9	9	23	15½	16	12¼
Lincoln	P	″	25	″	15	″	17	″	8	7	6½	9	7¼	23	12	16	9⅝
Kansas Prolific	B	″	29	″	18	″	20	″	12	7	6	2	10½	23	11	13	2¾
Barton's Eclipse	P	″	27	″	21	″	24	″	9	5	5¾	7	6½	23	10½	15	8½
Daniel Boone	P	″	29	″	18	″	21	″	9	7	6½	10	8	23	9½	17	0¾
Hood River	...	″	29	″	19	″	20	″	8	6	13¼	4	9¼	23	9	14	1⅛
Dr. Arp	P	″	27	″	22	″	24	″	12	6	5½	9	9	23	8¼	16	8⅝
G. H. Caughell	B	″	25	″	18	″	19	″	3	6	5¼	10	4¾	23	3½	16	12⅛
Tennessee Prolific	B	″	27	″	18	″	20	″	12	6	8	4	4½	23	2	13	11¼
Enormous	P	″	29	″	19	″	24	″	8	5	6½	5	13	22	12½	14	4¾
Princess	P	″	27	″	18	″	19	″	9	7	8¼	3	9	22	11	13	2
Parker Earle	B	″	25	″	18	″	19	″	9	7	5¾	8	12½	22	10¾	15	11⅝
Sherman	B	″	25	″	18	″	19	″	9	8	9	6	12	22	7	14	9½
Maggie	P	″	23	″	18	″	22	″	3	4	5¼	19	8¼	22	3½	20	13⅞
Thompson's Late	P	″	29	″	24	″	25	″	9	5	4½	18	15½	22	2	20	8¾
Wonderful	P	″	29	″	21	″	22	″	5	5	6¼	22	1½	21	13	21	15¼
Gen. Putman	P	″	25	″	18	″	24	″	9	4	6¼	8	2	21	12	14	15
Lovett	B	″	27	″	19	″	21	″	8	6	7	6	5½	21	9½	13	15½
Logan	B	″	27	″	22	″	24	″	9	5	6½	6	13½	21	3½	14	0½
Hatch Exp. Station	B	″	29	″	22	″	24	″	8	4	5½	1	14	21	2½	11	8¼
No Name	B	″	27	″	20	″	21	″	2	4	6	15	9¾	21	1½	18	5⅝
Morgan's Favorite	B	″	27	″	22	″	21	″	9	5	8½	4	11	21	1	12	14
Nick Ohmer	B	″	25	″	22	″	24	″	8	5	7½	4	12½	20	7	12	9¾
Cyclone	P	″	25	″	18	″	19	″	12	7	5½	9	4	20	7	14	13½
Mattie Warfield	P	″	27	″	21	″	22	″	5	5	7¼	22	5½	20	6	21	5¾
Brandywine	B	″	27	″	22	″	25	″	12	6	6½	9	9½	20	1	14	13¼
Nehring's Gem	P	″	29	″	19	″	21	″	9	5	6	5	14¾	19	15½	12	15⅛
Sadie	B	″	25	″	18	″	26	″	5	5	3½	4	5¾	19	15	12	2⅜
Ridgeway	B	″	29	″	22	″	24	″	12	7	5½	3	0½	19	12	11	6¼
Cameronian	B	″	28	″	20	″	21	″	9	6	8¼	6	2¼	19	8½	12	13⅜
Manwell	B	″	29	″	22	″	24	″	3	4	5¼	1	7½	19	3½	10	5½
Cobden Queen	P	″	29	″	19	″	20	″	3	5	5½	7	2½	18	14	13	0¼
World's Champion	B	″	28	″	22	″	24	″	12	6	5¼	......		18	9		
Daisy	P	″	25	″	18	″	22	″	8	5	7	33	2¼	18	6	25	12⅛

Name.	Bisexual Pistillate.	Date of full bloom.	Date of first ripe fruit.	Date of first picking.	Date of last picking.	Number of pickings.	Weight of 25 average berries.	Total yield, 1900.		Total yield, 1901.		Average yield, 1900 and 1901.	
							Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Anna Kennedy	P	May 29	June 17	June 19	July 5	6	5	7	10½	18	4	12	15¼
Anna Forest	P	" 25	" 18	" 20	" 3	4	7	5	7¾	17	15½	11	11⅝
Louis Gauthier	B	" 28	" 27	" 29	" 12	4	7½	4	11	17	15	11	5
Imp. Westbrook	P	" 25	" 18	" 20	" 3	5	5	2	11	17	11	10	3
Jucunda	B	" 29	" 22	" 24	" 5	5	8	4	7	17	10½	11	0¾
Wm. Belt	B	" 27	" 24	" 25	" 12	6	6½	1	12	17	10½	9	11¼
New Dominion	B	" 29	" 22	" 25	" 12	6	7¼	14	3¾	17	9½	15	14⅝
Stone's Early	P	" 25	" 17	" 19	" 5	6	4	19	4	17	6	18	5
Clyde	B	" 25	" 18	" 19	" 5	6	6½	10	8¾	17	3	13	13⅞
Phipen	B	" 28	" 22	" 24	" 8	5	4	...	....	17	0		
X 189	B	" 25	" 20	" 21	" 9	6	5½	7	1¾	16	14½	12	0⅛
Northern	B	" 23	" 15	" 17	" 5	7	5	11	11¼	16	12¾	14	4
Carleton	P	" 27	" 21	" 22	" 5	5	5¾	26	2	16	10½	21	6¼
Klickita	P	May 28	June 22	June 25	July 12	6	5¼	8	7½	16	4	12	5¾
Hattie Warfield	P	" 23	" 18	" 19	" 9	7	6½	15	9½	16	1	15	13¼
Sharpless Seedling	B	" 29	" 22	" 25	" 8	4	5½	....	....	15	11½	....	....
Lloyd	P	" 28	" 19	" 20	" 8	6	6	2	4	15	11	8	15½
Young's Seedling	B	" 27	" 18	" 22	" 5	5	5¼	13	8½	15	10½	14	9½
Mayflower	B	" 22	" 14	" 17	June 26	4	4½	4	6	15	4½	9	13¼
Afton	P	" 25	" 18	" 22	July 8	5	6½	31	6	15	4	23	5
Deveroux	B	" 25	" 22	" 24	" 8	5	7	....	....	15	3½	....	....
Sharpless	B	" 27	" 22	" 25	" 5	4	6½	5	10½	15	2	10	6¼
Starr	B	" 28	" 22	" 24	" 8	5	10½	4	11½	15	1	9	14¼
X 341	B	" 27	" 20	" 21	" 5	5	5½	6	15	14	15½	10	15¼
Hiawatha	B	" 28	" 22	" 24	" 8	5	6¾	4	1	14	15	9	8
Johnson's Early	B	" 23	" 17	" 20	" 8	6	6¼	3	8½	14	14	9	3¼
Judsonia	B	" 29	" 18	" 19	" 7	6	4¼	19	3¼	14	9¾	16	14½
Champion of England	B	" 27	" 22	" 25	" 9	5	5½	9	11½	14	6½	12	1
Surprise	....	" 27	" 24	" 24	" 5	4	7	7	13½	14	4¾	11	1⅛
Mrs. Cleveland	P	" 25	" 18	" 22	" 8	5	5½	10	14¼	14	0	12	7⅛
Howell's Seedling	B	" 29	" 22	" 24	" 8	5	5½	....	....	13	15	....	....
Scarlet Ball	P	" 29	" 24	" 26	" 12	5	6	5	5½	13	13½	9	9½
Winnie Warfield	P	" 27	" 24	" 25	" 8	4	7	7	7½	13	12¼	10	9⅞
Livingston	B	" 27	" 22	" 25	" 9	5	5¼	....	....	13	12	....	....
Beverly	B	" 28	" 22	" 25	" 12	6	6	1	12½	13	10¼	7	11⅜
Little's No. 7	B	" 27	" 22	" 24	" 8	5	5	....	....	13	10	....	....
Lady Rusk	P	" 25	" 18	" 21	" 12	6	7	11	1½	13	10	12	5¾
Ona	P	" 23	" 18	" 19	" 5	5	5	8	11½	13	9	11	2¼
Tubbs	B	" 25	" 18	" 19	" 3	5	6½	3	11½	13	2	8	6¾
Klondyke	B	" 29	" 24	" 26	" 8	4	5	3	15	13	1	8	8
Gandy	B	" 31	" 25	" 27	" 9	4	6¼	4	2½	13	0½	8	9½
Beede's No. 1	B	" 28	" 18	" 20	" 8	6	7½	1	8	12	15	7	3½
Sandoval	B	" 27	" 20	" 21	" 5	5	7½	8	9	12	15	10	12
Will Warfield	B	" 29	" 21	" 25	" 5	4	4½	11	14½	12	13½	12	6
Earliest	B	" 25	" 17	" 20	June 29	4	5½	1	10	12	13½	7	3¾
Crockett's	B	" 28	" 18	" 20	July 8	5	5	6	11½	12	11	9	11¼
Warfield	P	" 25	" 20	" 22	" 5	4	5¼	27	6½	12	10	20	0¼
Van Deman	B	" 25	" 14	" 17	" 5	7	4½	6	13½	12	9	9	11¼
X 119	B	" 27	" 19	" 21	" 9	6	7	....	....	11	13½	....	....
Satisfaction	B	" 25	" 18	" 21	" 5	5	4¼	15	2	11	13	13	7½
Gandy Belle	B	" 27	" 20	" 21	" 5	5	6½	6	14½	11	13	9	5¾
Kentucky	P	" 29	" 24	" 26	" 8	3	5½	2	2½	11	11	6	14¾
Marshall	B	" 23	" 18	" 19	" 12	7	9¼	4	7¾	11	9¼	8	0½
Staples	B	" 23	" 15	" 17	" 3	6	5½	12	11¾	11	8¾	12	2¼
Laxton's Noble	B	" 27	" 19	" 20	" 3	5	7½	....	....	11	7	....	....
Elba	B	" 25	" 15	" 17	June 29	5	5	5	7½	11	6	8	6¾
Erie	P	" 29	" 24	" 26	July 8	3	5	....	....	11	6	....	....
McKinley	B	" 28	" 22	" 24	" 3	4	6	2	7½	11	5½	6	14½
Crescent	P	" 27	" 18	" 19	" 5	6	4	9	14½	11	3	10	8¾
X 95	P	" 25	" 22	" 25	" 12	5	3	6	3½	10	12½	8	8
Steven's Early	P	" 27	" 18	" 22	" 3	4	6	28	5½	10	12	19	8¾
Swindle	P	" 25	" 20	" 24	" 9	3	5½	17	11¼	10	12	14	3⅜
Repeater	B	" 27	" 18	" 19	" 3	5	5¼	....	....	10	11	....	....
John Little	P	" 25	" 18	" 19	" 3	7	4	15	11	10	11	13	3
Saunders	B	" 27	" 20	" 21	" 5	5	5	7	1½	10	9	8	13¼
Haverland	P	" 23	" 17	" 19	" 5	6	8	11	5¾	10	8½	10	15⅛
Harville	B	" 28	" 19	" 20	" 8	6	5	1	12	10	6½	6	1¼
Edgar Queen	P	" 27	" 17	" 19	" 5	6	5¼	5	11½	10	6	8	0¾

Name.	Bisexual Pistillate.	Date of full bloom.	Date of first ripe fruit.	Date of first picking.	Date of last picking.	Number of pickings.	Weight of 25 average berries.	Total yield, 1900.		Total yield, 1901.		Average yield, 1900 and 1901.	
							Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Magoon	B	May 28	June 24	June 26	July 8	4	6	5	5	10	4	7	12½
Gladstone	B	" 28	" 22	" 24	" 5	4	7¼	2	11½	10	3	6	7¼
Excelsior	B	" 25	" 12	" 17	June 29	5	5	....		10	1	....	
King Worthy	B	" 28	" 22	" 24	July 8	5	5	....		10	1	....	
Bush Cluster	P	" 22	" 17	" 20	" 8	5	4½	10	1½	9	13½	9	15½
Snowball	B	" 25	" 18	" 19	" 5	5	7¾	7	7½	9	12¾	8	10⅛
Pennell	B	" 28	" 22	" 24	" 8	5	4	....		9	12	....	
Beauty	B	" 25	" 18	" 19	" 3	5	8	6	7½	9	9½	8	0½
Iowa Beauty	B	" 25	" 22	" 25	" 5	3	5	8	1	9	9	8	13
6 G	B	" 25	" 18	" 21	" 5	4	5¾	10	14¼	9	8½	10	3⅜
X 288	P	" 27	" 21	" 22	" 5	5	4¾	12	3½	9	8	10	13¾
Michel's Early	B	" 22	" 12	" 17	June 28	5	3½	4	7¾	9	7½	6	15⅝
Senator Dunlap	B	" 27	" 18	" 22	" 2	4	6	....		9	6	....	
Twilight	B	" 23	" 20	" 22	" 8	5	5¾	....		9	3½	....	
Bomba	P	" 28	" 18	" 20	June 26	3	6½	21	0¾	9	0	15	0⅜
Bouncer	B	" 27	" 20	" 20	July 3	4	8½	0	10½	8	15¾	4	13⅛
Timbrell	P	" 29	" 24	" 26	" 12	5	6	1	15½	8	9½	5	4½
Homestead	B	" 27	" 18	" 20	" 8	5	6	1	7	8	7½	4	15¼
Edgar	B	" 28	" 22	" 24	" 3	3	5¼	10	8	8	6	9	7
H. & H	P	" 23	" 14	" 17	" 3	5	4	2	6½	8	5½	5	6
Berlin	P	" 25	" 18	" 21	" 3	4	6	6	11¾	8	4	7	7⅞
Della	B	" 27	" 22	" 24	" 8	4	5½	0	11	8	4	4	7½
X 77	P	" 29	" 24	" 25	" 9	5	3½	8	6½	8	1	8	3¾
Jersey Market	P	" 29	" 18	" 20	" 8	5	5½	....		8	0	....	
Leamington	....	" 27	" 21	" 22	" 5	5	6½	....		7	15	....	
Seaford	P	" 28	" 18	" 21	" 3	4	7	11	5½	7	14½	9	10
Eleanor	B	" 23	" 15	" 17	" 5	7	5½	4	4	7	13¼	6	0⅝
Maximus	B	" 27	" 24	" 26	" 5	3	6½	1	14	7	13	4	13½
Osceola	B	" 22	" 14	" 17	" 3	6	3½	6	7¾	7	12¼	7	2
W. J. Bryan	B	" 23	" 20	" 22	" 8	5	6¼	....		7	10½	....	
Evans	B	" 29	" 18	" 20	" 3	5	5½	0	11	7	9	4	2
Greenville Seedling	B	" 27	" 18	" 19	" 5	5	5¼	8	9¼	7	6	7	15⅝
Hunn	P	" 29	" 30	July 2	" 12	4	7	1	12½	7	2	4	7¼
Banquet	B	" 27	" 18	June 21	" 3	4	7	7	13½	7	1	7	7¼
Cruse's No. 9	P	" 28	" 22	" 24	June 26	2	6½	10	0¼	7	1	8	8⅝
Rough Rider	B	" 29	" 22	" 24	July 3	4	5¼	....		7	0½	....	
Liddle	B	" 27	" 22	" 26	" 8	4	4½	....		7	0	....	
Boynton	P	" 25	" 17	" 19	June 25	3	5½	9	12	6	15	8	5½
Mrs. McDowell	....	" 29	" 22	" 25	July 9	5	7	....		6	15	....	
Jessie	B	" 23	" 18	" 19	" 8	6	5	2	1	6	11½	4	6¼
Little's No. 30	P	" 28	" 24	" 26	" 8	3	6	....		6	8	....	
Albert	B	" 31	" 27	July 3	" 12	3	6	....		6	7	....	
Darling	B	" 23	" 15	June 17	June 26	4	5½	2	6	6	6	4	6
Long Dark Seedling	B	" 27	" 21	" 22	July 2	4	6¼	9	3½	6	5½	7	12½
Early Canada	B	" 23	" 15	" 17	" 5	5	4	1	3½	6	4	3	11¾
St. Joseph	B	" 23	" 6	" 19	" 2	5	3½	3	3½	5	14	4	8¾
White Alpine	B	" 27	" 22	" 27	" 5	2	1¼	2	2	5	9	3	13½
Noble	B	" 25	" 22	" 24	June 29	3	6½	8	6¼	5	8	6	15⅛
Hill's Manchester	B	" 23	" 22	" 25	July 8	4	4	8	11	5	7½	7	1¼
Orange County	P	" 23	" 15	" 17	June 28	5	4¾	6	8½	5	4	5	14¼
Bennett	P	" 27	" 21	" 22	July 3	4	6	....		5	1½	....	
Sam Sperry	B	" 29	" 24	" 25	" 5	4	6	15	14¾	5	1	10	7⅞
Avery Seedling	P	" 25	" 18	" 20	June 29	4	5¼	1	5½	4	10	2	15¾
Emperor	B	" 25	" 20	" 21	" 26	3	6	....		4	6	....	
Woolverton	B	" 22	" 21	" 22	July 3	4	5	2	5½	4	3¼	3	4⅜
Oberholtzer No. 2	P	" 27	" 24	" 25	" 5	4	5½	6	5	3	4¾	4	12⅞
Gardner	B	" 29	" 18	" 21	June 26	2	5	6	1½	3	2½	4	10
Cinda	B	" 29	" 22	" 24	July 3	4	4	0	14½	3	1	1	15¾
Effie May	B	" 23	" 18	" 20	June 26	3	5¾	3	12½	3	0¾	3	6⅝
Bismarck	B	" 27	" 17	" 20	" 29	4	4¼	....		2	15	....	
Great American	...	" 29	" 27	" 29	July 8	3	4½	....		2	15	....	
Eureka	B	" 25	" 18	" 19	" 5	5	4½	....		2	13½	....	
Pride of Cumberland	B	" 28	" 24	" 26	" 3	3	5½	....		2	12½	....	
Philip's Seedling	B	" 29	" 24	" 26	June 26	1	6	9	14	2	10	6	4
Holland's Glory	B	" 28	" 22	" 25	July 5	4	1¼	0	5	2	2	1	3½
Augusta Narcaise	B	" 27	" 24	" 26	. 3	2	5	....		1	15	....	
Leader	B	" 23	" 18	" 22	June 28	3	6¼	9	1	1	12	5	6½
Empress of India	B	" 29	" 25	" 27	July 9	4	5½	0	12½	1	10	1	3¼
Mytrott	B	" 27	" 18	" 20	June 29	4	....	....		0	12½	.. .	

SPRAYING.

Spraying has long passed the experimental stage and it should not now be necessary to draw the attention of fruit growers to the importance of it. There are, however, a large number who do not spray. The proof of the value of spraying may now be had on every side, and it seems strange that good fruit is allowed to become worthless by disease when if sprayed in time it would be free, or almost free, from it. This year when the crop of apples was light and the prices high, it was especially desirable to keep what there was clean, and where this was done nearly as much money was realized in some cases as there would have been in a good fruit year, while on the other hand those who did not spray got very little.

A spraying calendar was published by the Entomologist and the Horticulturist this year, in which formulas are given for the various mixtures and solutions, what they are used for, and the time to apply them. This may be had on application. In a bulletin on Apple Culture, published this year also, further particulars were given on the subject of spraying.

The recent discoveries of Prof. T. J. Burrill, of the Illinois Agricultural Experiment Station, have necessitated a change in the time of the first spraying for the apple spot fungus. He found that the disease did not winter on the twigs as was supposed, but on the fallen leaves. Hence, the early spraying which it was customary to make with copper sulphate and water was really of little value in preventing the spread of the apple spot. It will, therefore, be advisable, to make the first spraying with the ordinary Bordeaux mixture and Paris green just as the leaf buds are breaking, regulating the time so as to kill the tent caterpillars which hatch about that time. The early sprayings are the most important, their object being to prevent the germination of the spores which alight on the leaves, fruit and other parts of the tree. Once the disease begins to spread it is very difficult to check it. Thorough spraying is just as important with other fruits as it is with the apple.

EXPERIMENTS WITH LIME MIXTURES FOR THE ERADICATION OF THE OYSTER-SHELL BARK-LOUSE.

Experiments were continued last winter with lime mixtures for the eradication of the oyster-shell bark-louse, in order to discover the best formula to use. As very severe weather occurred before the experiments were completed, and continued for some time, there were not as many mixtures used as had been planned, but the results obtained were very interesting. In the following table will be found a record of the work done and the results. The degrees of infestation, in ascending order, were : 'very few scales,' 'a few scales,' 'slightly infested,' 'moderately infested,' (meaning the same as 'considerably,' as used in 1900), and 'badly infested.' The spraying was done in November and December, 1900, and in January, 1901. Where possible the second application was made as soon as the first was dry.

Formula Used. — Number of Times Sprayed.	Number of Trees Sprayed.	How Infested before Spraying, December, 1900, and January, 1901.	How Infested after Spraying, December, 1901.
2 lbs. lime, 1 gallon water ; sprayed twice.	32	24 moderately ; 8 badly........	26 with very few scales ; 3 with few scales ; 3 slightly affected.
Sprayed 3 times........................	1	Badly..........	Slightly ; but few scales on young wood.
1 lb. lime, 1 gallon water ; sprayed twice.	3	All moderately..	A few scales on one and very few on two.
Sprayed 3 times	4	" ..	Two slightly ; two with but few scales.
1 lb. lime, 1 gallon water, 3⅕ oz. salt ; sprayed twice..........	4	" ..	Very few left on any of the trees.

CONCLUSIONS REACHED UP TO DECEMBER, 1901.

1. Lime slaked in water and sprayed on apple trees infested with the oyster-shell bark-louse has the effect of loosening the scales.

2. The scales, when loosened, are removed from the trees by rain, ice, wind, and probably by other means.

3. As the scales contain the eggs from which the young insects hatch about June 1, it is necessary, in order to get the best results, that the trees be sprayed as soon as possible after the leaves fall in autumn, so that the loosened scales may be exposed to the weather for a long time before the eggs hatch.

4. The lime appears to have no injurious effect on the eggs within the scales.

5. Lime used in various proportions in the several experiments had no apparent injurious effects on apple or peach trees. Even when the leaf buds were opening no injury occurred.

6. As the action of the lime seems to occur soon after the trees are sprayed, it is not necessary to use any substance other than water to help bind it to the tree. On the contrary, it would appear that such substances counterbalance the effects of the lime, for a time, by glueing the scales to the trees.

7. It is important to use good stone lime, which has not been air-slaked.

8. The most economical and satisfactory formula so far has been found to be, 1 lb. lime, 1 gallon water, and 3½ oz. salt, or for a barrel of mixture, 40 lbs. lime, 40 gallons water, 8 lbs. salt. This should be sprayed on the tree twice, the second application being made as soon as the first is dry. The same proportions of lime and water without the salt have given quite satisfactory results also, and the salt is not necessary, but when used the bark of the trees was cleaner and brighter.

9. It is necessary to make at least two applications, as those scales with which the mixture does not come in contact will not be effected by it, and it is not possible to do the work thoroughly with one spraying.

10. The bark of trees sprayed with the lime mixture is much brighter afterwards than on trees not sprayed, and it is possible that many fungous germs are destroyed.

ASPARAGUS RUST.

The asparagus rust, *Puccinia asparagi,* D.C., is a disease which has done much injury to asparagus in the United States during the past five years, and more recently it has effected that vegetable in Canada. This year it appeared at the Central Experimental Farm for the first time. The disease was introduced from Europe to the United States and came into prominence about 1896. It has already spread from the New England States to Kansas and north into Canada. The following description of the life history of the disease is quoted from bulletin No. 188 of the New York Agricultural Experiment Station, where extensive experiments have been carried on in combating it.

'The life history of the fungus which causes the disease is marked by three distinct stages, each ending in the production of a crop of spores from which new plants may spring. This profusion of spore-forms may account in a measure for the rapid spread of the disease.

The first stage of growth of the fungus usually passes unnoticed by the owners of infested asparagus fields ; for from the germination of the spores in the spring till the first fruiting in June, the entire plant is hidden deep in the tissues of its host ; and this fruit-bearing is accompanied by no such change in colour of the asparagus fields as marks the ripening of the second crop of spores. In this first stage, known as the 'spring form,' 'cluster-cup stage,' or, scientifically classified, as the 'acidial stage,' the spores break through the epidermis of the host plant in clusters of cup-shaped pustules. These cups are greenish-yellow at first but change to orange-yellow as they mature.

The summer stage follows this spring form, though the two may overlap, both stages existing at the same time in the same plant. The brown colour of the asparagus fields produced by the ripening spores of this second stage, the 'red rust' form, and the rapid spread of the disease at this time, cannot fail to attract attention to the fields affected. The spores from this stage discharge from slits in the asparagus stems, not from clusters of pustules, and are so numerous that they cover workmen and tools in the fields with a heavy coating like brick dust.

The third stage, known as the 'winter stage,' follows the one just described, either in the fall or even in the summer if the lessened vitality of its host plant betokens approaching death. It is by the spores of this stage that the fungus is carried over the winter, so Nature provides for their formation whenever the existence of the fungus is threatened by the death of the asparagus plant it infests. The third stage differs from the second only in the character of the spores. In the summer stage the spores are one-celled and thin-walled, while in the winter stage they are two-celled, thick-walled and of such a dark brown colour that the stage is known as the 'black rust.' Both summer and winter spores may often be found in the same slit in the asparagus stem.'

The drying up of the stems and foliage of the asparagus plants before the season's growth is made, weakens them very much and on this account the crop of young shoots the following spring is much lessened and becomes still less every year the disease affects the plants. Owing to its smooth leaves and stem, asparagus cannot be sprayed to advantage with Bordeaux mixture, as it runs off when applied. At Geneva a combination was made of a 'resin-lime' mixture and Bordeaux mixture, the stock solution of the former being made as follows :—

Pulverized resin	5 lbs.
Concentrated lye	1 lb.
Fish oil or any cheap animal oil, except tallow	1 pint
Water	5 galls.

'It takes about two hours to prepare this mixture. The oil, resin and one gallon of hot water should be placed in an iron kettle and heated until the resin is softened, after which the solution of concentrated lye, or potash, should be carefully added, and the mixture thoroughly stirred. After the lye has been added, add four more gallons of hot water and allow the whole mass to boil until the mixture will unite with cold water, making a clear, amber-coloured liquid. When through boiling if there is not five gallons of the mixture add water enough to make that quantity.'

Two pounds of this stock solution were added to the Bordeaux mixture before spraying. The following quotation gives the dates of spraying and the results obtained :—

'After the last cutting was made the brush was allowed to grow for four weeks, after which five sprayings were given, the first on July 28. Alternate rows were sprayed and left as checks. The rust showed on the unsprayed rows August 19, and by August 24 had spread to all parts of these rows. They were killed by September 10. The sprayed rows remained green until the middle of October, but it was only the growth made between July 1 and August 10 that survived the attacks of the rust until October 15 ; that is, a growth that was completed, hardened and thoroughly sprayed before the rust struck the bed. All the new sprouts which came up in the sprayed rows after the rust appeared in the field were destroyed.'

'The results proved that in the case of every unsprayed row the yield in 1900 was less than it was in 1899, the decrease on the seven rows being 179 pounds. On the sprayed rows, on the contrary, there was an equally constant gain in yield of from 11 to 22 pounds to the row, the total increase being 110 pounds.'

The results obtained at the New York Experiment Station prove that the disease can be lessened materially by spraying, and as the loss to asparagus growers in Canada is likely to be very great from it, something should be done at once to check it,

and the best remedy found so far is that just described. If spraying is not done the plants should be cut and burned to help prevent the spread of the disease, but if this is done early the plants are weakened and if done late the spores will have spread, so that the best practice is to spray.

No variety has yet been found to entirely resist this disease, although Palmetto and Argenteuil appear to be the least affected. Conover's Colossal is one of the most injured by it.

LIST OF BEST VEGETABLES FOR FARMERS.

As all the experiments which are conducted with vegetables cannot be published every year on account of want of space, a list of the varieties of all the principal kinds which have proved the most satisfactory after several years' tests was published in the reports for 1899 and 1900 under the heading 'List of best Vegetables for Farmers.' This gave in a concise form much valuable information as to the best varieties to plant and must have proved very helpful to those who studied it. As the annual reports are very liable to be mislaid during the year, and as one is apt to forget the name of a variety, it has been thought advisable to again publish this list with what changes another year's experience warrants making.

Asparagus.—Conover's Colossal is the best all-round variety, but this variety is more subject to rust than Palmetto or Argenteuil.

Beans.—Golden Wax or Wardwell's Kidney Wax, for early crop ; Early Refugee, for medium ; and Refugee or 1,000 to 1, for late crop, are the most satisfactory dwarf varieties. Asparagus (early) and Old Homestead are two of the best pole varieties.

Beets.—Egyptian Turnip, Eclipse and Bastian's Blood Turnip are three of the best varieties.

Borecole or Kale.—Dwarf Green Curled Scotch is the best.

Broccoli.—White Cape.

Brussels Sprouts.—Improved Dwarf is the most satisfactory.

Cabbage.—Early Jersey Wakefield (early), Succession (medium) ; Late Flat Dutch, Drumhead Savoy (late), Red Dutch (red), is a select list of the best varieties of cabbage.

Cauliflowers.—Extra Early Dwarf Erfurt and Early Snowball (early) ; and Large Late Algiers are among the best.

Carrots.—Chantenay and Guerande or Oxheart are two of the best carrots, but if a good extra early sort is required, the Early Scarlet Horn can be planted with advantage. It is a small variety.

Celery.—Golden Self-Blanching, Paris Golden Yellow, Improved White Plume, White Walnut (early) ; London Red, Perfection Heartwell, White Triumph (late) are among the best.

Corn.—Early Cory, Crosby's Early, Henderson's Metropolitan (early) ; Perry's Hybrid, Stabler's Early, Early Evergreen, and Black Mexican (medium); Stowell's Evergreen, Country Gentleman (late). In planting, the Country Gentleman should not be omitted, as it lengthens the season very considerably, and is of fine quality. Other promising sorts are Burbank's Early Maine, Early Fordhook (early) ; and Bonanza Sweet (late).

Cucumbers.—Peerless White Spine or White Spine, Cool and Crisp, and Giant Pera are three of the most satisfactory slicing varieties. Boston Pickling is a good pickling sort.

Burnet Grape, Showing Method of Pruning and Training.

Sprayed. Potatoes at C. E. F., Ottawa. Unsprayed.
September 25th, 1961.

Egg Plants.—New York Improved and Long Purple succeed best.

Lettuce.—Black Seeded Simpson, New York (curled), Tennis Ball, Salamander and Golden Queen (cabbage) ; Trianon and Paris Cos lettuce make a good list.

Melons, Musk.—Long Island Beauty, Hackensack and Montreal Market, of the Nutmeg type, and Surprise, Christiana and Emerald Gem, of the other types, are all good.

Melons, Water.—Cole's Early, Imperial, Ice Cream, and Phinney's Early are early water melons of excellent quality.

Onions.—Yellow Globe Danvers and Large Red Wethersfield are two of the best onions in cultivation.

Parsnips.—Hollow Crown and Dobbie's Selected are both good sorts.

Parsley.—Double Curled is as good as any.

Peppers.—Cayenne, Cardinal, Chili and Golden Dawn are four of the best.

Pease.—Gregory's Surprise, Gradus, Nott's Elcelsior and Premium Gem (early) ; McLean's Advancer, Nott's New Perfection, Improved Stratagem and Heroine (medium). None of these are tall growing varieties. Juno (dwarf), Telephone, Startler (tall), (late). Excelsior is a promising second early sort.

Potatoes.—Extra Early : Early Ohio and Early Andes (pink), Bovee and Burpee's Extra Early (pink and white). Early : Everett and Rochester Rose (pink), Early Puritan (white). Medium : Carman No. 1 (white), Empire State (white). Late : Late Puritan (white), American Wonder (white), Rural Blush (pink).

Radishes.—Early : Rosy Gem, French Breakfast, Red Rocket (red) and Icicle (white). Late : White Strasburg, Long White Vienna. Winter : Long Black Spanish, Chinese Rose-coloured.

Rhubarb.—Linnæus and Victoria are the most satisfactory.

Salsify.—Long White is the best.

Spinach.—Victoria and Thick-leaved are the best.

Squash.—Early : White Bush Scalloped and Summer Crook Neck. Late : Hubbard.

Tomatoes.—Early : Sparks' Earliana, Canada Victor, Early Ruby and Dwarf Champion. Main Crop : Brinton's Best, Trophy, Matchless, and Baltimore Prize Taker.

There are many varieties of tomatoes which are almost equal in excellence and productiveness.

Turnips.—Early : Extra Early Milan and Red Top Strap Leaf. Swedes : Champion Purple Top, Skirving's Improved.

EXPERIMENTS WITH POTATOES.

The potato crop was light in the Ottawa Valley this year, owing to dry weather during the month of July, and to rot in the autumn. While the yields at the Experimental Farm are not as large as last year, they are good and there was little injury either from dry weather or from rot. The rot is seldom troublesome when the potatoes are planted in well drained, sandy loam soil, as they were here, and owing to thorough cultivation the crop was not reduced much by the dry weather.

There were 133 varieties tested in uniform plots this year, of which the Burnaby Mammoth produced the best crop, the yield being at the rate of 530 bushels 12 lbs. per acre. The poorest yield was 173 bushels 48 lbs. per acre, the difference in yield

between the best and poorest being 356 bushels 24 lbs. per acre, showing the great importance of planting the most productive varieties. The average yield per acre from all the varieties tested was 365 bushels 25 lbs., being 247 bushels 25 lbs. greater than the average for the province of Ontario for 1901, which was 118 bushels. This difference is greater, however, than it would be if the varieties had been grown by the acre instead of in small plots.

The potatoes were planted this year in the same sandy loam soil they occupied in 1900, as in the orchard inclosure this was the best place available for them. On April 22 and 23, however, the land was given a good dressing of well rotted manure, which was ploughed under on April 25. Just before planting time it was thoroughly incorporated with the soil by harrowing, twice with the disc harrow and once with the smoothing harrow. Drills were made 2½ feet apart and about 4 inches deep. The sets were of fairly uniform size and had at least three eyes with a good amount of flesh and were planted 1 foot apart. Each variety occupied one row 66 feet long. The sets were covered with the hand hoe to get as nearly uniform conditions as possible. The soil was harrowed once before the potatoes came up, to kill any weeds which had germinated, to level the ground, and to loosen the surface of it. The soil between the rows was kept cultivated until the vines met, but the latter were not hilled up. The vines were sprayed with Paris green to destroy the potato beetle, and 4 times with Bordeaux mixture to prevent blight and rot. The potatoes were planted on May 28 and dug on October 4.

POTATOES—Test of Varieties.

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
1	Burnaby Mammoth	Good	530	12	490	36	39	36	Pink and white.
2	Dreer's Standard	"	506	0	457	36	48	24	White.
3	Late Puritan	"	503	48	440	0	63	48	"
4	Early White Prize	"	501	36	435	36	66	0	"
5	I.X.L	"	492	48	422	24	70	24	Pink and white.
6	Uncle Sam	Good	484	0	462	0	22	0	White.
7	Burnaby Seedling	"	479	36	418	0	61	36	Pink and white.
8	Canadian Beauty	"	479	36	400	24	79	12	"
9	Sabean's Elephant	"	473	0	415	48	57	12	White.
10	Green Mountain	"	470	48	422	24	48	24	"
11	White Elephant		464	12	420	12	44	0	Pink and white.
12	Seattle	Medium	462	0	415	48	46	12	White.
13	Vick's Extra Early	Good	462	0	391	36	70	24	Pink and white.
14	Money Maker	"	459	48	387	12	72	36	White.
15	American Wonder	"	455	24	418	0	37	24	"
16	Holborn Abundance	Medium	453	12	396	0	57	12	"
17	Pearce		446	36	413	36	33	0	Pink and white.
18	Burpee's Extra Early	Good	446	36	376	12	70	24	"
19	Clay Rose	Medium	444	24	418	0	26	24	Pink.
20	Maggie Murphy	"	440	0	409	12	30	48	Bright pink.
21	Livingston's Banner	Good	437	48	398	12	39	36	White.
22	Troy Seedling	Medium	435	36	396	0	39	36	"
23	Early Puritan	Good	435	36	380	36	55	0	"
24	Mills Prize	"	433	24	400	24	33	0	"
25	Rural Blush	"	433	24	389	24	44	0	Pink.
26	Jubilee	"	429	0	407	0	22	0	Pink and white.
27	Rochester Rose	"	422	24	354	12	68	12	Pink.
28	McIntyre	Medium	420	12	389	24	30	48	White and purple.
29	Churchill Seedling		420	12	385	0	35	12	White.
30	Cambridge Russet	Good	420	12	363	0	57	12	"
31	Polaris	"	418	0	369	36	48	24	"
32	Early St. George	"	418	0	360	48	57	12	Pink and white.
33	Carman No. 1	"	415	48	369	36	46	12	White.
34	State of Maine	"	413	36	385	0	28	36	"
35	Great Divide	"	411	24	360	48	50	36	"
36	Vigorosa		411	24	343	12	68	12	Pink and white.

POTATOES—Test of Varieties—*Continued.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
37	Early Norther	Good	409	12	334	24	74	48	Pink.
38	Rawdon Rose	"	407	0	358	36	48	24	Pink and white.
39	Earliest of All	"	407	0	336	36	70	24	"
40	Enormous	"	402	36	380	36	22	0	White.
41	Vanier	Poor to medium	402	36	334	24	68	12	Red.
42	Dr. Maercher		402	36	297	0	105	36	White.
43	Quaker City		400	24	374	0	26	24	"
44	Brown's Rot Proof	Medium	398	12	347	36	50	36	Pink.
45	Early Harvest	Good	398	12	341	0	57	12	"
46	Irish Cobbler	"	396	0	365	12	30	48	White.
47	Burbank's Seedling	"	396	0	354	12	41	48	"
48	Early Sunrise	"	391	36	343	12	48	24	Pink.
49	Delaware	"	389	24	363	0	26	24	White.
50	Montana Bluff		389	24	356	24	33	0	White, bright pink eye.
51	Early Pride	Good	389	24	336	36	52	48	Pink.
52	Wonder of the World	"	389	24	334	24	55	0	Pink and white.
53	Red Rock		389	24	323	24	66	0	Red.
54	Everett	Good	385	0	312	24	72	36	Pink.
55	General Gordon	"	382	48	312	24	70	24	"
56	Early Elkinah		380	36	336	36	44	0	"
57	Dublin Prize		380	36	327	48	52	48	
58	Peachblow		378	24	338	48	39	36	White.
59	Reeves' Rose		376	12	321	12	55	0	Pink.
60	Country Gentleman		374	0	319	0	55	0	Pink and white.
61	Rose of the North		371	48	305	48	66	0	Pink.
62	Lees' Favourite	Good	369	36	321	12	48	24	"
63	New Queen	"	369	36	314	36	55	0	Pink and white.
64	American Giant	Medium	367	24	325	36	41	48	White.
65	Early Michigan		367	24	323	24	44	0	"
66	Sir Walter Raleigh		365	12	338	48	26	24	"
67	Seedling No. 7	Medium	365	12	334	24	30	48	Bright pink.
68	Flemish Beauty Seedling	Poor	365	12	319	0	46	12	"
69	Champion		360	48	294	48	66	0	White.
70	Seedling No. 230	Medium	360	48	314	36	46	12	"
71	Mammoth Pearl		356	24	314	36	41	48	"
72	Rural No. 2	Good	354	12	332	12	22	0	"
73	Northern Spy	Poor	354	12	290	24	63	48	Bright pink.
74	Napoleon	Good	349	48	325	36	24	12	Pink.
75	Sharpe's Seedling	"	345	24	261	48	83	36	Pink and white.
76	Brosseau		343	12	316	48	26	24	Red and white.
77	Dakota Red	Medium	343	12	303	36	39	36	Red.
78	N. Bergeron		343	12	299	12	44	0	White, pink eye.
79	Dutch Blue		341	0	279	24	61	36	Dark purple.
80	Swiss Snowflake	Good	338	48	299	12	39	36	White.
81	Early Ohio	"	336	36	305	48	30	48	Pink.
82	Early Market		336	36	301	24	35	12	"
83	Irish Daisy	Good	336	36	292	36	44	0	White.
84	Pearce's Extra Early	"	336	36	286	0	50	36	Pink.
85	Early Rose	"	336	36	248	36	88	0	"
86	Bovee	"	334	24	281	36	52	48	Pink and white.
87	Early Summer		334	24	281	36	52	48	"
88	Early Andes	Good	334	24	253	0	81	24	Pink.
89	Dobson's Early		332	12	268	24	63	48	White.
90	Thorburn	Good	327	48	275	0	52	48	Pink and white.
91	20th Century		327	48	253	0	74	48	White.
92	Bliss Triumph		325	36	299	12	26	24	Red.
93	Early Dawn		325	36	297	0	28	36	Pink, brighter at seed end.
94	Prize Taker	Good	325	36	277	22	48	24	Pink.
95	Doherty's Seedling		323	24	299	12	24	12	White.
96	Livingston		323	24	294	48	28	36	White, pink eye.
97	Light Red Seedling		323	24	257	24	66	0	Pink.
98	Rose No. 9	Medium	321	12	290	24	30	48	"
99	Dark Red Seedling		321	12	286	0	35	12	Deep pink.

POTATOES—Test of Varieties—*Concluded.*

No.	Name of Variety.	Quality.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Colour.
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
100	White Beauty	Good	319	0	281	36	37	24	White.
101	Rose of Erin		316	48	299	12	17	36	Pale pink, bright pink eye.
102	Chicago Market	Good	316	48	297	0	19	48	Pink.
103	Early Rose	"	316	48	228	48	88	0	"
104	Pearce's Prize Winner	"	314	36	246	24	68	12	"
105	Daisy	"	314	36	233	12	81	24	Pink and white.
106	Carman No. 3	"	312	24	294	48	17	36	White.
107	Columbus		310	12	270	36	39	36	Pink and white.
108	Ohio Junior		308	0	283	48	24	12	Pink.
109	Empire State	Good	308	0	281	36	26	24	White.
110	Silver Dollar		308	0	259	36	48	24	"
111	Penn. Manor		305	48	222	12	83	36	Pink and white.
112	Early Six Weeks	Good	303	36	286	0	17	36	Pink.
113	Gem of Aroostook	"	301	24	275	0	26	24	Pink and white.
114	Beauty of Hebron	Medium	294	48	250	48	44	0	"
115	Hale's Champion	Poor	294	24	248	36	41	48	White.
116	Pink Eye		290	24	246	24	44	0	White, bright pink eye.
117	Maule's Thoroughbred		290	24	242	0	48	24	Pink.
118	Reading Giant	Poor	286	0	244	12	41	48	"
119	Blue Potato		283	48	244	12	39	36	Deep purple.
120	White Giant		279	24	244	12	35	12	White.
121	Harvest King		275	0	248	36	26	24	"
122	Lizzie's Pride	Good	275	0	231	0	44	0	Pink, red eye.
123	New Variety No. 1	Poor	270	36	246	24	24	12	White.
124	Seedling No. 214	Good	264	0	228	48	35	12	"
125	Prolific Rose		264	0	226	36	37	24	Pink.
126	Bill Nye		253	0	162	48	90	12	White.
127	Seneca Queen	Very good	250	48	217	48	33	0	Pink and white, bright pink eye.
128	Clark's No. 1	Good	242	0	204	36	37	24	Pink.
129	Brownell's Winner	"	231	0	213	24	17	36	Red.
130	Houlton Rose		228	48	184	48	44	0	Pink.
131	Wall's Orange		226	36	204	36	22	0	Yellow, purple eye.
132	Up to Date		226	36	160	36	66	0	White.
133	Pride of the Market	Good	173	48	156	12	17	36	"

ADDITIONAL VARIETIES OF POTATOES TESTED IN 1901.

In addition to the varieties of potatoes grown in the uniform test plots, smaller quantities of the following varieties were planted :—

Name of Variety.	Number of Sets Planted.	Total Yield per Acre.		Yield per Acre Marketable.		Yield per Acre Unmarketable.		Colour.
		Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	
Northern Beauty	33	422	24	378	24	44	..	
Pingree	33	422	24	316	48	105	36	
Dooley	33	400	24	334	24	66	..	
Early Envoy	33	334	24	268	24	66	..	
Wonderful	33	325	36	268	24	57	12	
California Cup	33	268	24	198	..	70	24	
Eureka Extra Early	33	210	33	188	46	21	47	

TWELVE BEST YIELDING VARIETIES OF POTATOES—AVERAGE OF SEVEN YEARS' TESTS.

Name of Variety.	Average Yield per Acre.		Name of Variety.	Average Yield per Acre.	
	Bush.	lbs.		Bush.	lbs.
1. Holborn Abundance...........	424	51	7. Dreer's Standard.............	373	34
2. Seattle.........................	422	59	8. Everett..........................	373	2
3. American Wonder...............	418	8	9. State of Maine..................	369	50
4. Late Puritan....................	406	1	10. Polaris.........................	368	59
5. Seedling No. 230..............	388	8	11. Vanier..........................	368	30
6. Burnaby Seedling..............	381	48	12. Empire State..................	368	15

This table was taken from Bulletin 39 prepared by Dr. Wm. Saunders.

POTATOES—PLANTING AT DIFFERENT DISTANCES APART.

For the past six years an experiment has been tried in planting the sets at different distances apart in the rows, the rows in each case being 2½ feet apart. The best average results have been obtained, so far, by planting the sets 14 inches apart, though the results from planting 12 inches apart are nearly the same. The yields of unmarketable potatoes in this test did not vary much except where the sets were planted 8 inches apart, but in this case there was a somewhat larger proportion of unmarketable potatoes than in the others. For the first four years of this test only one variety was used, but during the last two years two were planted and their average yield given. This year the varieties planted were Everett and Uncle Sam, an early and a late variety. The amount of seed per acre used may appear large, but from experiments conducted here it has been found advisable to use large sets.

Distances apart of Sets.	Seed required per acre.		Yield per acre, 1896.		Yield per acre, 1897.		Yield per acre, 1898.		Yield per acre. 1899.		Yield per acre, 1900.		Yield per acre, 1901.		Average Yield per acre, 6 years.		Average Yield per acre, after deducting seed..	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
10 inches apart.	34	50	:5	18	331		268	24	392	2	327	48	393	48	344	43	309	53
12 " ..	29	2	336	36	278	47	3:7	36	406	34	316	48	385		345	13	316	11
14 " ..	24	53	323	24	268	50	290	24	454	58	325	36	398	12	343	34	318	41
16 " ..	21	46	335	30	226	1	233	12	392	3	279	24	429		315	52	294	6
18 " ..	19	21	289	18	226	31	253		234	34	270	36	369	36	273	56	254	35

POTATOES—PLANTING AT DIFFERENT DEPTHS.

An experiment has been conducted during the past four years in planting potatoes at different depths in rows 2½ feet apart and 12 inches apart in the rows. The sets had at least three eyes each, and were about uniform in size. The soil was sandy loam, every year. Level cultivation was adopted, and thus very little soil was thrown on the potatoes after they were covered at the time of planting. The following table shows that the best yields were obtained from planting the sets only 1 inch deep. As the relative yields from the different depths of planting have not been the same every year, it will be necessary to continue this test for some time before accurate conclu-

sions can be drawn. Notes were taken on the depths at which tubers were formed in 1899, 1900 and 1901, and it was found that most of them were within 4 inches of the surface of the soil, even where the sets had ben planted 6, 7 and 8 inches deep. Where the sets were planted less than 4 inches deep nearly all the tubers were formed between that and the surface of the soil. Two varieties, the Sir Walter Raleigh and Empire State, were used in the test this year, and the average results from them are given as the yields for 1901. There are several reasons why the potatoes planted from 1 to 3 inches deep should give the best results. Potatoes will develop more rapidly in warm soil than in that which is cooler. The soil within the first three or four inches of the surface is warmer than that three or four inches lower down, hence the conditions are more favourable for the potato. The tubers when the potato is in the wild state develop near the surface or on the surface of the ground. It seems natural, therefore, that the cultivated potato should be planted shallow.

On the other hand, much of the success of shallow planting will depend on the moisture of the soil. If the season is very dry the first two inches of soil may be so dry that the potato will not take root readily, and the season of growth will thus be shortened, but this has not happened here during the past four years. Once the roots begin to grow they speedily reach a depth where plenty of moisture is found.

From the results obtained it seems reasonable to conclude that where sandy loam soil is not dry the best results can be obtained from shallow planting. In any case, early planted potatoes will probably succeed best when planted shallow, as the ground will be warmer. In places where the spring is late or where the ground is cold, best results will probably be had by shallow planting.

Although the best results have been obtained in sandy loam soil by planting the sets one inch deep, this method is not recommended for field culture. Unless the surface of the soil is kept loose and free from weeds the potato crop will not be large. In order to kill a large proportion of the weeds which grow, the ground should be harrowed once or twice before the potatoes come up or just as they are coming up. If the sets were planted only one inch deep and the soil harrowed, many of them would be dragged out, hence about four inches deep would probably be the best.

Depth of Planting.	Yield per acre, 1898.		Yield per acre, 1899.		Yield per acre, 1900.		Yield per acre, 1901.		Average Yield per acre, 1898-1901.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
1 inch	347	36	532	24	468	36	371	48	430	6
2 inches	244	12	469	28	462	00	321	12	349	13
3 "	281	36	493	41	422	24	343	12	385	13
4 "	277	12	520	18	404	48	312	24	378	40
5 "	290	24	474	19	334	24	319	00	354	24
6 "	264	00	421	5	367	24	327	48	345	4
7 "	290	24	392	3	336	36	242	00	315	15
8 "	266	12	353	19	345	24	182	36	286	52

POTATOES PLANTED AT DIFFERENT DATES.

In 1898, an experiment was begun in planting potatoes at different dates, beginning when the main crop was put in and continuing at intervals of two weeks until August 23, 1898 ; July 23, 1899 ; July 21, 1900 ; and July 11, 1901. An early and a late variety were used each year, the varieties being Early Norther and Irish Daisy, in 1898 ; Early Norther and Rural Blush, in 1899 ; Early Norther and Sir Walter Raleigh, in 1900, and Early St. George and Rural No. 2, in 1901.

In 1898 and 1899 the decrease after the third planting was so great that it appeared as if a fair crop of marketable potatoes could not be produced when the seed was

planted much after June 24, but the results obtained in 1900 by planting on July 7 proved that it is possible to produce a good crop of potatoes after a crop of early vegetables, such as pease, has been removed. The fourth planting in 1901 was a little later than in previous years and the season not as favourable as in 1900.

Date of Planting.	Total Yield per acre, 1898.		Total Yield per acre, 1899.		Total Yield per acre, 1900.		Total Yield per acre, 1901.		Average Total Yield per acre, 1898-1901.		Average Yield per acre, Marketable, 1898-01		Average Yield per acre, Unmarketable, 1898-1901.	
Early Variety.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
1st planting, May 26, 1898; May 26, 1899; May 26, 1900; May 30, 1901	277	12	505	47	409	12	374	00	391	33	337	55	53	38
2nd planting, June 10, 1898; June 9, 1899; June 9, 1900; June 13, 1901	160	36	459	48	453	12	299	12	343	12	276	25	67	47
3rd planting, June 24, 1898; June 23, 1899; June 23, 1900; June 27, 1901	125	24	237	10	365	12	246	24	243	32	196	1	47	31
4th planting, July 8, 1898; July 7, 1899; July 7, 1900; July 11, 1901	30	48	9	41	268	24	74	48	95	55	67	6	28	49
5th planting, July 23, 1898; July 21, 1899; July 21, 1900	1	6	....		26	24								
6th planting, August 9, 1898 7th " " 23, 1898	No yield													
Late Variety.														
Planted on same dates as the early variety—														
1st planting	259	36	338	48	277	12	501	36	344	18	296	7	48	11
2nd "	173	48	164	34	338	48	404	48	270	29	216	22	54	7
3rd "	68	12	157	18	198	00	325	36	187	16	158	9	29	7
4th "	8	48	19	22	202	24	57	12	71	56	40	42	31	14
5th "	1	6	....		26	24								
6th " 7th "	No yield													

POTATOES—RESULTS OF SPRAYING WITH BORDEAUX MIXTURE FOR THE PREVENTION OF BLIGHT AND ROT.

It is the usual practice to spray the experimental plots of potatoes at the Central Experimental Farm with Bordeaux mixture for the prevention of rot and blight, but owing to the nature of the soil in which they are planted, nearly always a light sandy loam, it is seldom that rot is troublesome. This year, however, 8 varieties were planted on May 30 in heavier and wetter soil, for the purpose of demonstrating the advantage of spraying. Of each variety there were four rows, 33 feet in length, sprayed, and the same area left unsprayed. The mixture was 6 lbs. of bluestone, 4 lbs. of lime, and 40 gallons of water. The first spraying was made on July 2, and the vines were kept covered with the mixture throughout the rest of the season.

Name of Variety.	Plants dead where sprayed.	Plants dead where unsprayed.	Total yield per acre, sound potatoes, sprayed.		Total yield per acre, sound potatoes, unsprayed.		Difference in yield per acre, sprayed and unsprayed.		Yield of rotten potatoes per acre, unsprayed.	
			Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Swiss Snowflake	Oct. 4, not dead	Sept. 28	312	6	229	54	112	12	26	24
Burnaby Mammoth	Sept. 30	" 21	464	12	292	36	171	36	47	18
American Wonder	" 30	" 21	377	18	222	12	155	6	77	
General Gordon	" 30	" 19	313	30	270	36	42	54	19	48
Early Norther	Oct. 2	" 20	322	18	306	54	15	24	8	48
Rose No. 9	Sept. 30	" 21	497	12	376	12	121		2	12
Early Harvest	" 28	" 16	426	48	310	12	116	·36	27	30
Lee's Favorite	" 30	" 16	272	48	246	24	26	24	20	54

There was a very light erop of potatoes this season owing to dry weather at a critical period in the growth of the plants, followed later on by blight and rot, and thus the results obtained by spraying with Bordeaux mixture show the great importance of this work. It will be observed that the sprayed plants grew from 6 to 14 days longer than the unsprayed, during which time the small potatoes were getting larger and the erop greater. There were no rotten potatoes in the sprayed lot.

EXPERIMENTS WITH TOMATOES.

After five years' test a large number of varieties of tomatoes were discontinued this year, but with the new kinds added there were 100 varieties still under test this season, but more will be discarded before planting next year.

The yields of the twenty-five best yielding varieties, only, are published, as spaee will not permit of giving a full table. In addition to this list, however, will be found the names of the six earliest varieties for this year, also the six wrinkled and twelve smooth kinds which have averaged the highest yields for six years. It will be noticed that the Canada Victor has been put in the table of wrinkled varieties this year, as the proportion of wrinkled tomatoes produeed by it is greater than smooth.

The seed of the tomatoes grown this year was sown in hot-beds on April 6 ; the young plants were pricked out into strawberry boxes on April 29, and planted in the open ground on June 3. They were placeed four feet apart each way, and five plants of each variety were used. The soil was a light sandy loam in which tomatoes had been grown the previous season. It was heavily manured for tobaeeo in 1899, but none was applied in 1900. Rye was sown in the autumn of 1900 and ploughed under on May 30, and the land prepared for tomatoes without any additional fertilizer. The soil was kept eultivated until the growth of the plants prevented it. The vines were not trained in any way, but were allowed to lie on the ground. This was a favourable season for tomatoes and there was little green fruit left on the vines when frost came. There was eonsiderable rot this year, but notwithstanding that fact the erop of good tomatoes was large.

TOMATOES—TEST OF VARIETIES.

Name of Variety.	Date of first ripe fruit.	Yield of ripe fruit, first three pickings.		Yield of ripe fruit, balance of pickings.		Total yield of ripe fruit, all pickings.		Remarks.
		Lbs.	ozs.	Lbs.	ozs.	Lbs.	ozs.	
1 Baltimore Prize Taker	Aug. 14..	....		127	15	127	15	Above medium size, smooth, purplish pink.
2 Child's Ruby Queen..	" 24..	....		124	9	124	9	Large to very large, deep red, wrinkled.
3 King Humbert.......	" 9..		15	118	13	119	12	Below medium, wrinkled, scarlet.
4 Creekside Glory	" 19..	....		118	2	118	2	Above medium, wrinkled, scarlet.
5 Extra Early Red.....	" 5..	1	1	116	14	117	15	Below medium, smooth, scarlet.
6 Extra Early Advance.	" 6..		6	113	5	113	11	Below medium, smooth, scarlet.
7 Turner's Hybrid.....	" 1..		13½	109	7	110	4½	Large, smooth to slightly wrinkled, purplish.
8 Early Bermuda......	" 3..		9¾	107	13	108	6¾	Medium to above medium, wrinkled, scarlet.
9 Freedom	" 8..		6	107	4	107	10	Medium to below medium, smooth, scarlet.
10 Early Michigan	" 24..	....		107	10	107	10	Medium, smooth, scarlet.
11 Maule's Earliest	" 12..		8½	105	3½	105	12	Medium to large, wrinkled, scarlet.
12 Burpee's Climax......	" 14..	1	4½	103	4½	104	9	Medium, smooth, purplish pink.
13 Extra Early Purple Advance...........	" 6..		2	102	10	102	12	Medium to below medium, smooth, purplish pink.
14 Extra Early Jersey ..	" 5..	1	5½	101	00	102	5½	Medium to above medium, wrinkled, scarlet.
15 Acme................	" 18..	....		100	7	100	7	Medium, smooth, purplish pink.
16 Money Maker	" 3..		4⅔	98	13	99	1⅔	Medium to above medium, wrinkled, scarlet.
17 Long Keeper	" 15..		4	98	10	98	14	Medium, smooth, purplish pink.
18 Improved Trophy....	" 12..		6	98	00	98	6	Above medium to large, smooth, scarlet.
19 Essex Hybrid........	" 19..	.... ..		96	12	96	12	Above medium, smooth, purplish pink.
20 Bright and Early	" 17..	....		96	1	96	1	Below medium, smooth, scarlet.
21 Sutton's Eclipse......	" 22..	.... . .		94	4	94	4	Medium, smooth, scarlet.
22 Liberty Bell..........	" 19..	....		92	12	92	12	Medium to above medium, smooth, scarlet.
23 Early Bird	" 3..		15	91	6	92	5	Below medium, smooth, purplish pink.
24 Conqueror	" 5..		6	91	14	92	4	Medium to large, wrinkled, scarlet.
25 Sparks' Earliana.....	July 27..	3	8½	86	6	89	14½	Medium, smooth, scarlet.

TOMATOES—SIX EARLIEST VARIETIES.

Name of Variety.	Date of First Ripe Fruit.	Yield of Ripe Fruit, First Three Pickings.		Yield of Ripe Fruit, Balance of Pickings.		Total Yield of Ripe Fruit, All Pickings		Remarks.
		Lbs.	Ozs.	Lbs.	Ozs.	Lbs.	Ozs.	
Sparks' Earliana ..	July 27....	3	8½	86	6	89	14½	Medium size, smooth, scarlet.
Earliest of All....	Aug. 3....	1	7¼	53	8	54	15¼	Above medium, wrinkled, scarlet.
Extra Early Jersey	" 5....	1	5½	101	0	102	5½	Medium to above, wrinkled, scarlet
Dominion Day....	" 1....	1	1¾	71	0	72	1¾	Above medium, wrinkled, scarlet.
Extra Early Red..	" 5....	1	1	116	14	117	15	Below medium, smooth, scarlet.
Essex Early South.	" 3....	0	15¼	74	6	75	5¼	Below medium, smooth, scarlet.

The first fruit of a few other varieties was ripe earlier than some of these, but the yield from the first three pickings was smaller. Sparks' Earliana was the best early tomato in 1901.

SIX BEST YIELDING WRINKLED VARIETIES—AVERAGE FOR SIX YEARS.

Name of Variety.	Average Date of First Ripe Fruit.	Average Yield per Acre.		Remarks.
		Lbs.	Ozs.	
Early Bermuda	Aug. 6	17	5	Medium to above medium, wrinkled, scarlet.
Money Maker	" 4	16	0	Medium to above, wrinkled, scarlet.
Extra Early Jersey	" 4	15	5	Medium to above, wrinkled, scarlet.
Canada Victor	" 4	15	5	Medium size, wrinkled to smooth, scarlet.
Early Richmond	" 5	14	8	Medium to above, wrinkled, scarlet.
Conqueror	" 2	14	0	Medium to large, wrinkled, scarlet.

TWELVE BEST YIELDING SMOOTH VARIETIES—AVERAGE FOR SIX YEARS.

Baltimore Prize Taker	Aug. 7	16	8	Medium to above medium, regular, smooth, purplish pink.
Extra Early Advance	" 4	15	4	Below medium size, smooth, scarlet.
Bond's Early Minnesota	" 1	15	0	Medium to below medium, smooth, purplish pink.
Essex Hybrid	" 8	14	10	Medium to above medium, regular, smooth, purplish pink.
Brinton's Best	" 13	14	9	Above medium to large, regular, smooth, scarlet.
Comrade	" 7	14	8	Medium to below medium, smooth, scarlet.
Early Ruby	July 31	14	7	Medium size, smooth to slightly wrinkled, scarlet.
Trophy	Aug. 13	13	15	Above medium to large, smooth, scarlet.
Mayflower	" 7	13	9	Medium to large, regular, smooth, scarlet.
Autocrat	" 11	13	7	Medium to above, smooth, purplish pink.
Atlantic Prize	" 5	12	14	Medium size, smooth to wrinkled, scarlet.
Matchless	" 12	12	11	Above medium size, regular, smooth, scarlet.

For shorter periods, the following varieties have averaged well :—Bright and Early (5 years), 16 lbs. 6 oz. ; Freedom (4 years), 14 lbs. 9 oz. ; Maule's Earliest (3 years), 14 lbs. 15 oz. ; Creekside Glory (3 years), 14 lbs. 4 oz. ; Early Bird (3 years), 14 lbs. 1 oz.

PEASE—EXPERIMENTS FOR COMPARISON OF YIELDS AND QUALITY.

For the past four years a large number of varieties of garden pease have been tested in the horticultural department and notes taken on their earliness, productiveness, and quality ; the length of vines being also ascertained. In 1900, twenty-seven varieties which were considered the most promising from the standpoint of yield and quality were grown on larger plots in order to learn which were the best. This experiment was continued this year and the average results for the two years are given in the following table.

Twelve hundred selected pease of each variety were sown in drills 100 feet long and 2½ feet apart on May 10. The pease germinated well and there was a good stand. As each variety became ready for use, the date was recorded and the yields of green pods from the several pickings also made.

PEASE—TEST OF VARIETIES.

Name of Variety.	Ready for Use, 1900.	Ready for Use, 1901.	Number of Pickings, 1900.	Number of Pickings, 1901.	Total Yield of Green Pods, 1900.	Total Yield of Green Pods, 1901.	Average Yield of Green Pods, 1900-1901.	Length of Vine, 1900.	Quality.
Early.					Qts.	Qts.	Qts.	Inches.	
Gregory's Surprise......	June 29	July 1	3	3	20	31	25½	18 to 22	Very good.
Cleveland's First and Best	July 1	" 1	3	3	26	31	28½	20 " 22	Medium.
Alaska....................	" 2	....	2	...	24	...	.....	24 " 28	"
Station..................	" 3	July 1	2	3	22	29	25½	18 " 21	Very good.
Premium Gem	" 4	" 5	3	4	36	34	35	24 " 28	"
Chelsea..................	" 4	" 8	4	3	31	30	30½	12 " 16	"
Nott's Excelsior..........	" 4	" 5	2	3	23	20	21½	12 " 15	"
Child's Morning Star.....	" 4	" 1	2	2	19	25	22	30 " 34	"
Exonian.................	" 4	" 4	2	3	20	29	24½	24 " 26	Good.
American Wonder..	" 5	" 6	2	3	22	31	26½	15 " 20	Very good.
Second Early.									
Nott's New Perfection....	" 9	" 10	3	4	33	33	33	22 " 26	Very good.
Gradus	" 9	" 6	2	4	29	29	29	28 " 32	"
English Wonder....	" 9	" 10	3	4	26	31	28½	16 " 20	Good.
Medium.									
McLean's Little Gem....	" 12	" 13	3	6	36	42	39	34 " 40	Very good.
McLean's Advancer......	" 14	" 13	3	6	38	35	36½	30 " 34	"
Burpee's Quantity........	" 17	" 12	2	3	47	38	42½	34 " 38	Good.
Heroine.....	....	" 17	......	3	......	18			
Late.									
Dwarf Telephone......	July 19	" 24	3	2	40	16	28	22 " 26	Very good.
Startler..................	" 19	" 17	2	4	41	32	36½	38 " 42	"
McLean's Prolific....... ..	" 21	" 20	2	4	62	24	43	36 " 40	Good.
Yorkshire Hero.........	" 21	" 17	2	4	36	27	31½	30 " 34	Very good.
New Victory.	" 22	....	2	....	52	......	......	38 " 42	Good.
Champion of England .. .	" 23	July 19	2	4	60	39	49½	60 " 66	Very good.
Boston Wrinkled.........	" 23	" 17	2	4	54	45	49½	48 " 52	Good.
Eugenie..	" 23	" 17	3	4	50	29	39½	48 " 54	"
Juno...	" 23	" 21	2	3	44	18	31	30 " 34	"
Stratagem, Improved.....	" 24	" 17	1	3	36	14	25	28 " 32	Very good.
Veitch's Perfection.	" 31	" 19	2	4	38	23	30½	60 " 66	Good.

EXPERIMENTS WITH CORN.

For the past three years a large number of varieties of garden corn have been tested. In the reports for 1899 and 1900 full lists were published of the varieties with notes regarding them. Owing to the lack of space, the results this year are given of only twenty-four kinds, these being the varieties which have given the best average yields for three years in the several classes into which the varieties were divided, namely, early, second early, medium, and late. The soil in which the corn was planted was a light sandy loam on which squash, melons, and tobacco had grown in 1900. It received a good dressing of barn-yard manure in the spring of 1901, and was then ploughed and thoroughly harrowed. The corn was planted on May 31 in hills three feet apart each way, the places having been previously marked by a corn planter. About six kernels were planted in a hill. After germination had taken place and danger from cut-worms was over, the number of plants in a hill was reduced to four. Twenty-four hills of each variety were planted, but twelve average hills of each were used for comparison. The corn was kept thoroughly cultivated

during the summer and when growth had ceased in the autumn it was cut and the ears removed and counted.

Name of Variety.	Kind.	Fit for use, 1899.	Fit for use, 1900.	Fit for use, 1901.	Height, 1901.	Length of ears, 1899.	Length of ears, 1900.	Length of ears, 1901.	Average length of ears for 3 years.	Marketable ears from 12 hills, 1899.	Marketable ears from 12 hills, 1900.	Marketable ears from 12 hills, 1901.	Average number of marketable ears for 3 years.
Early Varieties.					Ft. in.	in.	in.	in.	in.				
Burbank's Early Maine...	Sweet	Aug. 16	Aug. 11	....	7 · 6	6	6½	8	6⅚	59	54	77	63
Early Fordhook........ .	"	" 17	" 10	Aug. 13	5 11	6	6	7	6⅓	52	52	79	61
Extra Early Cory	"	" 15	" 11	" 13	5 10	6½	5½	7	6⅓	60	53	67	60
Lackey's Early Sweet	"	" 17	" 11	" 14	6 8	7	6	7½	6⅚	56	48	68	57
Early Marblehead........	"	" 15	" 12	" 13	5 11	7	6	7	6⅔	52	48	59	53
Ford's Early.............	"	" 17	" 11	" 12	5 7	7	7	7½	7⅙	49	52	55	52
Second Early.													
Crosby's Extra Early.....	"	" 23	" 27	" 24	7 0	6	6	7	6⅓	50	69	56	58
Low's Perfection..........	"	" 25	" 31	" 27	8 1	7½	8	7½	7⅔	59	71	42	57
Kendall's Early Giant..	"	" 21	" 22	" 24	7 4	7½	6½	7½	7⅙	43	40	79	54
Early Giant Sweet	"	" 24	" 20	" 27	7 6	7½	6	8½	7⅓	52	37	59	49
Shaker's Early............	"	" 26	" 27	" 27	7 6	8	9	8	8⅓	50	50	42	47
Child's Honey Dew... .	"	" 25	" 29	" 24	7 0	7	7	8	7⅓	54	46	38	46
Intermediate.													
Black Mexican..........	"	" 28	Sept. 9	Aug. 29	7 2	7	6½	7½	7	71	67	57	65
Burlington Hybrid........	"	" 28	" 7	Sept. 3	8 4	8	7½	8	7⅚	53	64	60	59
Stablers' Early...........	"	" 29	Aug. 28	Aug. 27	7 6	8	8	7½	7⅚	39	57	64	53
Roslyn Hybrid	"	Sept. 1	Sept. 10	" 27	8 2	8	8	8	8	38	62	46	49
Moor's Early Concord	"	Aug. 31	" 6	" 28	8 4	8	7½	7½	7⅔	44	50	47	47
Zig Zag Evergreen.......	"	Sep . 2	" 15	Sept. 2	8 2	7	6½	7	6⅚	35	40	65	47
Late Varieties.													
Bonanza Sweet	"	Sept. 4	Sept. 10	Aug. 26	7 2	7	8	7	7⅓	35	51	62	49
Country Gentleman......	"	" 12	" 12	Sept. 4	8 0	7	7	6½	6⅚	44	58	40	47
Shoe Peg	"	" 4	" 18	" 3	7 6	6	7	7	6⅔	30	47	41	39
Columbus Market........	"	" 4	" 16	" 2	8 10	10	8	10	9⅓	36	40	42	39
Mammoth Sweet.........	"	" 12	" 19	Aug. 30	9 4	6	8	9½	7⅚	14	45	42	34
Stowell's Evergreen	"	" 12	" 12	Sept. 3	9 0	7	7½	9	7⅚	16	42	42	33

EXPERIMENTS WITH MUSK MELONS.

A large number of varieties of musk melons have been tested during the past three years, and notes were taken on their productiveness, quality and time of maturing. In 1901 there were 62 varieties under test, most of which ripened. The seed was sown in strawberry boxes on May 6 and the plants grown in a hot-bed until June 4, when they were planted in the open ground, the soil being a warm light sandy loam. The melons were put in hills eight by eight feet apart, which had been prepared by removing the soil and replacing it with two shovelfuls of short barn-yard manure on which were thrown back from four to five inches of the surface soil. When the hills were ready the strawberry boxes were broken without loosening the soil, and the plants were then carefully set. When established there were usually four plants to a hill. The soil was kept cultivated until the growth of the plants prevented it.

In the following table the names are given of the twenty-five varieties which have averaged the best crops in three years, with notes regarding them.

MUSK MELONS.

Name of Variety.	Date of First Ripe Melon, 1899.	Date of First Ripe Melon, 1900.	Date of First Ripe Melon, 1901.	Number of Ripe Melons, 1899.	Number of Ripe Melons, 1900.	Number of Ripe Melons, 1901.	Average No. of Ripe Melons for 3 Years.	Average Weight per Melon for 1901. Lbs.	oz.	Size and Quality.
Netted Gem	Sept. 13.	Sept. 5.	Aug. 30.	8	45	88	47	1	1½	Small, green flesh, good quality.
Rocky Ford	Aug. 29.	″ 10.	Sept. 4.	25	37	54	39	0	14¾	″ ″
Extra Early Prize	″ 29.	″ 3.	Aug. 24.	32	45	27	35	1	8	Small, green flesh, poor quality.
Earliest Ripe	Sept. 8.	″ 8.	″ 22.	23	37	46	35	1	6	Above medium, yellow flesh, medium quality.
Emerald Gem	″ 2.	Aug. 29.	″ 28.	14	39	37	30	1	12	Small, yellow flesh, very good quality.
The Captain	″ 13.	Sept. 5.	″ 30.	21	28	42	30	1	3	Small, green flesh, medium quality.
Earliest of All	″ 19.	″ 8.	″ 24.	5	15	41	20	0	14	Small, green flesh, good quality.
Early Bristol	″ 13.	″ 18.	″ 30.	1	30	26	19	2	0	Below medium size, green flesh, medium quality.
Early Green Nutmeg	″ 8.	″ 13.	Sept. 4.	6	8	39	18	2	10¼	Medium size, green flesh, very good quality.
White Japan	″ 19.	″ 10.	″ 3.	11	6	36	18	2	7½	Below medium size, green flesh, very good quality.
Cosmopolitan	″ 8.	″ 8.	Aug. 28.	11	16	25	17	2	8	Medium size, green flesh, very good quality.
Golden Jenny	″ 19.	″ 17.	″ 28.	7	5	40	17	1	2½	Small, green flesh, medium quality.
Long Yellow	Aug. 26.	″ 8.	″ 22.	9	2	37	16	4	11¾	Large, yellow flesh, poor quality.
Pine Apple	Sept. 13.	″ 3.	″ 31.	6	7	34	16	1	15¼	Small, green flesh, good quality.
Hackensack	″ 19.	″ 19.	″ 24.	7	1	39	16	3	0	Medium size, green flesh, good quality.
Early Burlington	″ 23.	″ 10.	″ 31.	10	16	21	16	1	9½	Below medium size, green flesh, good quality.
Princess	″ 19.	″ 18.	″ 31.	4	15	27	15	3	1	Medium size, green flesh, good quality.
Banana	″ 23.	″ 25.	Sept. 7.	5	12	27	15	4	10¾	Medium size, yellow flesh, good quality.
Improved Cantaloupe	″ 2.	″ 18.	Aug. 26.	7	4	28	13	5	0¾	Above medium size, deep yellow flesh, poor quality.
Early Cassaba	″ 8.	″ 18.	Sept. 4.	13	2	25	13	2	11	Below medium size, green flesh, good quality.
Missouri	″ 29.	″ 10.	″ 7.	1	15	24	13	1	15½	Below medium size, green flesh, good quality.
Christiana	″ 13.	″ 8.	Aug. 31.	5	6	26	12	2	3½	Below medium size, yellow flesh, very good quality.
Bay View	″ 25.	″ 17.	Sept. 4.	5	4	23	11	4	0½	Below medium size, green flesh, medium quality.
Surprise	″ 19.	″ 17.	″ 4.	3	2	29	11	4	1¼	Medium size, yellow flesh, very good quality.
New Triumph	″ 29.	″ 4.	Aug. 26.	1	3	30	11	3	12½	Above medium size, deep yellow flesh, good quality.

It will be noticed that the Montreal Market, one of the best commercial melons, does not appear in this list, the reason being that it is a comparatively late variety and needs to be forced under glass for a time after planting.

EXPERIMENTS WITH TOBACCO.

There were 46 varieties of tobacco tested this year, and nearly all of these matured, as the season was very favourable for the growth of this plant. The seed was

sown in a hot-bed on April 11, and the young plants transplanted to a cold frame on May 17, and planted in the field on June 12. The soil was a sandy loam, which received a good dressing of partially rotted manure in the spring, which was ploughed under and the ground thoroughly harrowed and marked. The plants were then set 3 x 3½ feet apart, after which the soil was kept thoroughly cultivated until there was danger of the leaves being injured. The tops and suckers were removed at the proper time. In this test 15 average plants were selected from the 20 planted and the yield is estimated from them. Naturally the yield per acre is greater than if the plots had been larger. The tobacco was cut on September 8 and taken to the curing house, and when cured the leaves were stripped and weighed.

In the following table the average results are given for 1898, 1900 and 1901. There was a little more moisture than there should have been when the tobacco was weighed in 1899 and the yields for that year are not included.

Name of Variety.	Date of Topping, 1901.		Total Yield per acre, 1901.		Total Yield per acre, 1900.		Total Yield per acre, 1898.		Average Total Yield for 3 years.	
			Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
Maryland	Aug.	1	2,937	13	2,350	7	1,844	14	2,377	11
Pennsylvania Seed Leaf	July	30	2,886	1	2,073	13	1,391	8	2,117	2
Brazilian American	"	24	2,419	6	1,831	14	1,557	14	1,936	6
Safrano	"	29	2,765	1	1,399	14	1,588	2	1,917	11
Connecticut Seed Leaf	"	29	2,713	14	1,417	2	1,427	6	1,852	13
Tennessee Red	"	29	2,160	3	1,555	5	1,633	8	1,783	0
East Hartford	Aug.	1	2,004	11	1,503	9	1,557	14	1,688	11
Virginia Oak Hill Yellow	July	27	2,143	1	1,624	7	1,285	10	1,684	6
Kentucky Burley	"	27	2,039	4	1,157	15	1,746	15	1,648	1
Climax	Aug.	1	2,142	15	1,382	12	1,391	8	1,639	1
Tuckahoe	July	27	1,952	13	1,572	11	1,187	5	1,570	15
Sterling	"	27	1,883	11	1,589	14	1,209	3	1,560	15
Hyco	"	27	1,572	10	1,486	4	1,603	4	1,554	1
Gold Leaf	"	29	1,468	15	1,780	0	1,393	10	1,547	8
Virginia One Sucker	"	24	1,866	7	1,261	9	1,391	8	1,506	8
Havana	"	24	2,333	0	1,313	6	850	4	1,498	14
Oronoka Yellow	Aug.	1	1,469	0	1,382	8	1,641	1	1,497	8
Sumatra	July	29	1,987	6	967	13	1,534	9	1,496	9
Pryor Yellow	"	24	1,676	5	1,244	5	1,536	9	1,485	12
Zimmer's Spanish	"	22	1,659	1	1,486	4	1,202	7	1,449	4
Granville Co. Yellow	"	29	1,123	5	1,382	9	1,755	13	1,420	9
Oronoka White Stem	"	24	1,313	7	1,382	9	1,504	15	1,400	5
Hester	"	24	1,572	10	1,123	5	1,421	12	1,372	9
White Stem	Aug.	1	1,071	8	1,192	7	1,614	8	1,292	13
Honduras	July	29	1,071	7	1,296	2	1,232	11	1,200	1
Primus	"	30	1,192	8	1,175	3	1,164	10	1,177	7
Cuban Seed Leaf	"	22	1,140	9	1,192	8	1,020	15	1,118	0
Persian Rose	"	22	1,175	4	1,071	7	710	14	985	14
Florida	"	10	725	15	829	8	748	11	768	1
Canelle	"	8	380	4	397	8	455	7	411	1
White Burley					1,330	11	1,323	7		
Comstock Spanish	July	22	2,298	8	1,348	1				
Turkish Aromatic	"	29	1,883	12	1,382	8				
Lancaster Co. Broad Leaf	Aug.	5	1,572	10	1,114	10				
Kentucky Yellow	July	27	1,555	6	1,192	7				
Latakia	"	29	1,555	5	846	12				
Improved White Burley	Aug.	1	1,468	14	1,935	9				
Goach	July	29	1,434	7	1,399	15				
Long Leaf Goach	"	29	1,399	13	1,572	10				
General Grant	"	29	1,382	9	1,382	8				
Famous	Aug.	1	1,351	1	1,088	12				
Big Oronoka	July	29	1,244	5	1,330	10				
Pryor Blue	"	27	1,244	4	1,399	13				
Bonanza	Aug.	1	1,157	14	1,520	13				
Persian Muscatelle	July	16	1,019	11	1,175	2				
Harby	"	10	794	15	1,123	5				
Small Red Canadian	"	4	397	9	881	9				

Larger areas were planted with six varieties and the results are given in the following table :—

Name of Variety.	Number of Plants.	Total Yield per acre, dry leaves.	Condition when cut.
	Lbs.	Lbs.	
Connecticut Seed Leaf	550	2,192	Ripe.
Zimmers Spanish	555	1,557	"
Improved White Burley	477	1,546	"
Pennsylvania Seed Leaf	551	1,447	"
Small Havana	541	1,363	"
Little Oronoka	613	1,188	"

FOREST BELTS.

The forest belts at the Central Experimental Farm extend along its northern and western boundaries ; the belt on the western boundary is 165 feet wide, and that on the northern boundary 65 feet ; their total length being nearly 1¾ miles. The number of trees growing in these belts, including those in an evergreen clump, is about 23,300.

The forest belts were planted for several objects, one of the principal being to gain information regarding the growth of the best timber trees, when grown on different kinds of soil and at different distances apart. The distances chosen at first were 5 by 5 feet, 5 by 10 feet, and 10 by 10 feet apart. The planting was also done to learn how the growth of trees planted in blocks of single species compared with that of trees grown in mixed plantations. Another object was to learn what influence the forest belts would have on the crops in the adjoining fields as regards the shelter afforded by them. The planting was also done with a view to the improvement of the landscape, and the various species were arranged so that a good effect would be produced. In addition to all this, it was intended that as much other data as possible should be gathered and that the forest belts would prove object lessons to those who were interested in tree growth.

It is now thirteen years since the first trees were planted in the belts referrd to, and the growth already made is a useful object lesson and should encourage the more extensive planting of timber trees. The soil in which the trees were planted was in many instances poor, and while a number of species appear to succeed almost as well on poor as on good land, yet some kinds require good soil in order to grow successfully. As to the distance apart at which it is desirable that trees should be planted, those which were put 5 by 5 feet apart are making, in most cases, the best trees for timber purposes, as the lower limbs are dying, leaving the trunks clean, which will make the wood freer from knots than where planted 10 by 10, or 10 by 5 feet apart, as at those distances there are, as yet, few instances where the lower limbs have died. The trees planted 5 by 5 feet apart, also, are a little taller as a rule than where wider planting was adopted, but the diameter of the trunk is not so great. The closely planted trees are more protected from storms and there are fewer broken tops and crooked stems. The desirability of close planting was also very apparent until quite recently in the condition of the surface of the ground where the trees are ten feet apart, which, in a number of cases, still required cultivation ; as it was necessary,

in order to keep the sod from forming and checking the growth of the trees, to cultivate the soil, whereas, in most instances, where the trees are planted 5 by 5 feet apart, the surface soil was kept shaded and moist, and sod did not form. As the conditions of soil are different in the belts where the trees are planted in clumps of a single species and where the several kinds are mixed together, a fair comparison of these two methods of planting cannot yet be made, but the advantages derived from mixing the leafier sorts of trees with those which are not very leafy, are already apparent. Where thin foliaged trees had been planted 5 by 5 feet apart and had had eight years' growth, the sod still formed very readily unless the soil was kept cultivated, thus showing that sufficient shade was not afforded to prevent the growth of grass and weeds. In 1899 some plantations were begun with trees and shrubs set 2½ feet apart each way in order to get the ground shaded soon. Most of these have made good growth, and the experiment promises to be very interesting, as different kinds of trees and shrubs were used for undergrowth. These plantations were cultivated this year and in 1900.

In the annual reports for 1897 and 1899, tables were published in which were given the measurements of trees in the forest belts at the Central Experimental Farm. A table is again published this year in which will be found the height and diameter of the trees up to the autumn of the present year.

GROWTH of Trees in the Forest Belts at the Central Experimental Farm.

Name of Species.	Character of Soil.	When Planted.	Distance Apart.	Age or Height when Planted.	Average Height, 1900.		Average Height, 1901.		Average Diameter 4' 6" from ground, 1901.
			Feet.	Years.	ft.	in.	ft.	in.	
Black Walnut—Juglans nigra	Low sandy loam	1888	5× 5	1	11	6	12	.	$1\frac{11}{12}$
" "	"	1888	10×10	1	7	..	7	11	$1\frac{1}{4}$
" "	Sandy loam with small stones	1889	5× 5	2	16	4	17	7	$2\frac{11}{12}$
" "	" "	1889	10×10	2	12	3	13	4	$2\frac{7}{12}$
" "	Clay loam	1888	10× 5	1	14	1	15	4	$2\frac{7}{8}$
Butternut—Juglans cinerea	Low sandy loam	1889	5× 5	1	11	7	11	11	$1\frac{7}{8}$
" "	"	1888	10×10	1	10	1	10	6	$1\frac{5}{8}$
Silver-leaved Maple—Acer dasycarpum	Light sandy loam	1889	5× 5	3	27	3	28	..	$2\frac{5}{8}$
" "	"	1889	10×10	3	24	8	25	1	$4\frac{1}{4}$
European White Birch—Betula alba	"	1889	5× 5	3	34	8	35	9	$3\frac{3}{4}$
" "	"	1889	10×10	3	37	3	38	7	$6\frac{1}{2}$
Canoe Birch—Betula papyrifera	"	1889	5× 5	3	31	..	32	7	$3\frac{5}{8}$
" "	"	1889	10×10	3	31	1	32	8	$5\frac{1}{8}$
Yellow Birch—Betula lutea	"	1889	5× 5	3	21	10	23	..	$2\frac{3}{4}$
" "	"	1889	10×10	3	21	8	23	6	$3\frac{1}{2}$
White Elm—Ulmus americana	Sandy loam	1889	5× 5	3	17	3	18	1	$2\frac{1}{4}$
" "	"	1889	10×10	3	18	9	19	8	$3\frac{17}{24}$
Black Ash—Fraxinus sambucifolia	Black muck	1889	5× 5	2	18	2	18	10	$2\frac{15}{18}$
" "	Low sandy loam	1889	10×10	2	11	11	12	5	$1\frac{17}{24}$
Green Ash—Fraxinus viridis	Black muck	1889	5× 5	3	20	10	22	8	$2\frac{4}{5}$
" "	Low sandy loam	1889	10×10	3	17	2	18	5	$3\frac{1}{4}$
Red Ash—Fraxinus pubescens	Black muck	1889	5× 5	2	22	8	24	4	$2\frac{11}{12}$
" "	Light sandy loam	1889	10×10	2	17	2	18	10	$2\frac{13}{24}$
White Ash—Fraxinus americana	Black muck	1889	5× 5	3	24	1	24	8	$2\frac{31}{40}$
" "	Light sandy loam	1889	10×10	3	23	10	25	9	$3\frac{13}{35}$
Black Cherry—Prunus serotina	Light sandy loam and gravel	1889	5× 5	3	18	11	19	11	$2\frac{5}{8}$
" "	" "	1889	10×10	3	24	4	26	7	4
Box Elder—Acer Negundo	Light sandy loam	1889	5× 5	2	25	2	26	4	$3\frac{1}{8}$
				in.					
Scotch Pine—Pinus sylvestris	Sandy loam with gravel	1888	5× 5	18	23	6	24	9	$3\frac{5}{8}$
" "	" "	1888	10×10	18	21	2	22	7	$4\frac{5}{6}$
" "	Low sandy loam with gravel	1888	5× 5	18	22	9	24	2	$3\frac{1}{12}$
" "	Low sandy loam	1888	10×10	18	21	10	23	..	$4\frac{2}{3}$
" "	Light sandy loam	1888	10× 5	18	24	5	25	9	$6\frac{7}{8}$
" "	Clay loam	1888	10× 5	18	20	9	22	2	$5\frac{3}{16}$
" "	Light sandy loam and gravel	1888	10× 5	18	23	5	25	2	$5\frac{7}{8}$
" "	" "	1887	3× 3	9	24	4	26	..	$3\frac{1}{4}$

GROWTH of Trees in the Forest Belts at the Central Experimental Farm—*Concluded.*

Name of Species.	Character of Soil.	When Planted.	Distance Apart.	Age or Height when Planted.	Average Height, 1900.		Average Height, 1901.		Average Diameter 4′ 6″ from ground, 1901.
			Feet.	in.	ft.	in.	ft.	in.	
Austrian Pine—Pinus austriaca	Light sandy loam	1889	5 × 5	18	17	10	19	9	$4\frac{1}{4}$
" "	"	1889	10 × 10	18	18	1	19	9	$5\frac{3}{8}$
" "	"	1888	10 × 5	15	17	5	19	7	$4\frac{2}{3}$
" "	Clay loam	1888	10 × 5	15	17	..	18	11	$4\frac{1}{2}$
" "	Light sandy loam and gravel	1888	10 × 5	15	19	6	21	6	5
" "	" "	1887	3 × 3	15	18	..	19	8	$3\frac{1}{6}$
White Spruce—Picea alba	Light sandy loam	1889	5 × 5	15	13	2	14	2	$2\frac{1}{12}$
" "	"	1889	10 × 10	15	14	..	14	10	$2\frac{1}{2}\frac{1}{4}$
Norway Spruce—Picea excelsa	"	1889	5 × 5	18	15	11	17	2	$2\frac{3}{8}$
" "	"	1889	10 × 10	18	20	1	22	..	$3\frac{1}{3}$
" "	"	1888	10 × 5	15	23	4	25	7	$3\frac{3}{4}$
" "	Clay loam	1888	10 × 5	15	23	11	25	11	$4\frac{5}{6}$
American Arbor-vitæ—Thuya occidentalis	Low sandy loam and black muck	1889	5 × 5	18	15	..	16	5	$2\frac{2}{3}$
" "	Low sandy loam	1889	10 × 10	18	13	9	14	10	$2\frac{5}{12}$
				feet.					
European Larch—Larix europæa	"	1888	5 × 5	2	26	10	28	..	$3\frac{1}{2}$
" "	"	1888	10 × 10	2	27	6	28	5	$4\frac{3}{5}$
White Pine—Pinus Strobus	Light sandy loam with gravel	1889	5 × 5	8 to 10 in.	22	9	24	6	$3\frac{17}{24}$
" "	" "	1889	10 × 10	8 to 10 in.	21	..	22	7	$5\frac{1}{3}$

The trees in the above table which have not made satisfactory growth owing to unsuitability of soil and other causes are Black Walnut, Butternut, White Elm, and Norway S -uce. Under better conditions these trees would have made much more growth.

During the autumn of 1901 the following additions were made to the trees in the forest belt along the western boundary. These were planted to replace other kinds which had not succeeded. The trees and shrubs were planted 2½ feet apart each way, the object being to get the ground shaded as soon as possible, in order that weeds would be killed, moisture conserved and the soil kept from baking without having to cultivate. There was also the important object of making the permanent trees shoot up straight without side branches. Necessarily, the great majority of the trees and shrubs planted were for this purpose.

Name.	Number Planted.	Height when planted.
White Ash (*Fraxinus americana*)	275	4 feet.
Tamarac (*Larix americana*)	413	3 "
White Spruce (*Picea alba*)	105	2 "
Box Elder (*Acer negundo*)	300	2-year-old tree cut back to ground.
Alder Buckthorn (*Rhamnus Frangula*)	879	6 inches.
Ninebark (*Neillia opulifolia*)	203	2-year-old shrubs cut back to ground.
Rosemary Willow (*Salix rosmarinifolia*)	1,483	Unrooted cuttings.
Total	3,658	

In addition to these there were Black Walnut, White Pine, Hard Maple, Rosemary Willow, Sand Cherry, and White Ash used to complete the plantations begun in 1899.

ARBORETUM AND BOTANIC GARDEN.

Comparatively little is known of the Arboretum and Botanic Garden at the Central Experimental Farm, except by those who have visited Ottawa and seen it. When the farm was purchased, in 1886, sixty-five acres were selected for that purpose, and planting was begun in the autumn of 1889. Most of the land is high, and a fine view is obtained of the city of Ottawa on the north and east, while to the south there is a pleasing view across country with glimpses of the Rideau river in the distance. The Arboretum is bounded on one side by the Rideau canal, which at this point has marshy banks which take away much of the sameness which the canal would otherwise have, and also afford a splendid opportunity for experiments with aquatics, though little has yet been done in this direction.

Twelve years ago, when the first planting was made, comparatively little was known of the hardiness of a large number of trees, shrubs and herbaceous plants, as the number of species and varieties found in gardens was limited, but now 3,728 kinds of trees and shrubs, and over 1,600 perennials have been tested and notes taken on all of them. The number of individual specimens of trees and shrubs living in the Arboretum at the present time is more than 4,200. This large collection has been obtained from many sources. From donations of seeds from botanic gardens throughout the world a large number of species and varieties have been grown, the Royal Gardens, Kew, supplying many of them. The catalogues of nurserymen in America, Europe, and Asia have been searched to increase the collection until it is now difficult to obtain additional species of many genera.

Particular attention has been given to those genera which include a large number of hardy species, such as Syringa, Lonicera, and Berberis, and these have been made as complete as possible, as their usefulness extends over a larger area than those which are not so hardy.

Descriptive lists of hardy trees, shrubs and herbaceous perennials which have been found the most ornamental have been published, and have proven very useful to persons desiring to plant their grounds. A catalogue has also been published of all the trees and shrubs tested in the Arboretum up to the year 1899, and notes given as to their hardiness ; but in this list no descriptions are given.

The winter of 1900-1 caused more injury than usual to the trees and shrubs, some species and varieties which had hitherto been hardy having their tops badly winter killed. There were long spells of dry, cold weather last winter, and there was probably more evaporation from the wood than the trees could stand ; as confirming this opinion, some trees and shrubs which are not hardy and which grow late in the autumn and are thus well charged with sap when winter sets in, were no more injured than usual.

The Arboretum looked better this year than ever before, as more labour was given to it than previously ; the trees and shrubs also as they grow larger add to the beauty of it.

This year a nursery was established in part of the Arboretum in which were planted the trees and shrubs which are to be used by the Ottawa Improvement Commission for beautifying the city of Ottawa.

Few trees and shrubs were planted in the Arboretum this year, but 525 specimens of nearly as many species and varieties were imported from Europe and were grown in nursery rows this year as it was thought that better results would be obtained than if they were planted in their permanent places at once.

The collection of perennials was increased by 525 species and varieties this year, making a total of 1,586 species and varieties now living in the border. A large collection of species and varieties of Michaelmas daisies or wild asters which was planted this year added much to the attractiveness of the border this autumn. Some of the new varieties are very handsome and should be planted in every garden, as they bloom until killed by frost.

LILACS.

The lilac is one of the most popular hardy shrubs, which is due largely to the delicious perfume and delicate tints of the flowers, its extreme hardiness and ease of culture, and also to the fact that it begins to bloom during the month of May, when all flowers are much appreciated. The leaves develop early in the spring and do not fall until late in the autumn, which, with their attractive deep green colour, add to the beauty and popularity of this shrub. By making a judicious selection of species and varieties of lilacs, bloom may be obtained from the third week of May until the first week of July. It is an old favourite, the common species (*Syringa vulgaris*), having been cultivated more than three hundred years ago, but it is only during comparatively recent times that it has been improved and the exquisite varieties produced which are such an acquisition to our gardens. The first double variety was introduced in 1870. Although there are now 11 species in cultivation, most of these were introduced during the last one hundred years. There are 130 species and varieties being tested in the Arboretum which includes all the species and most of the varieties in cultivation.

The lilac may be propagated very easily either by budding or root grafting on lilac stock, which may be grown quite readily from seed or obtained as suckers from older bushes. It is quite possible also to graft the lilac on privet or ash, but these

stocks are not satisfactory. The lilac will also grow from green or ripe wood cuttings. Some of the varieties now to be obtained were originated by cross-breeding, and this work offers a very delightful field for him who will devote his time to it.

Lilacs grow well in many kinds of soil, but they do best in that which is moderately rich and well drained. They produce such an abundance of flowers and seeds that if grown in poor soil they will soon deteriorate. Suckers should be kept cut out of the older bushes, as these often are the cause of the shrubs not blooming well, and where grafted or budded varieties are grown it is absolutely necessary to do this. Very little additional pruning is needed. During recent years lilacs have been used quite extensively for forcing, the white varieties being the most popular.

Insects rarely injure the flowers or foliage of lilacs and they are seldom affected by disease, the leaves, however, being occasionally mildewed.

Following is a descriptive list of the species tested here and of the best varieties which have flowered. The species are arranged according to their time of blooming, beginning with the earliest :—

Syringa vulgaris, L. (Common lilac).—The common lilac is a native of Eastern Europe, and was introduced to cultivation in 1597. It is the best known of all the lilacs, being found growing in nearly every garden, but is often neglected and allowed to sucker badly, but even with this neglect it produces a profusion of flowers which are not surpassed in perfume by any of the newer varieties. It begins to bloom during the third week of May and lasts until near the end of the month. There are a much larger number of seedlings of this species than of any other and some of them are greatly superior to the parent, being of exquisite form and colour. Of these, 110 are being tested in the Arboretum, and the following are the best of those which have bloomed :—

S. vulgaris, Leon Simon.—A very double variety with a large compact truss and large flowers of a fine shade of lilac, with short petals. The buds are of a brighter tint which adds to its attractiveness. Blooms in the last week of May. One of the best doubles.

S. vulgaris, Maxime Cornu.—Double. Truss large. A very distinct variety, the flowers of which are almost pink. Very good. Blooms during the fourth week of May.

S. vulgaris, Charles X.—Single. This is one of the oldest yet one of the best of the improved varieties. It is a most profuse bloomer, no other variety excelling it in this respect. The trusses are large and the flowers of an attractive deep purplish red colour. It blooms a few days later than the common lilac, being at its best during the fourth week of May.

S. vulgaris, Jean Bart.—Double. Truss large and loose. Flowers double and of a fine shade of purple with twisted petals which give it a more graceful appearance than some of the more compact sorts. It is also beautiful when in bud, being then deep lilac. Very good. Blooms during the fourth week of May.

S. vulgaris, Jacques Calot.—Single. A free bloomer with large trusses and very large flowers, the latter being of an attractive shade of lilac. Blooms during the fourth week of May. One of the best.

S. vulgaris, Souvenir de Ludwig Spath.—Single. This is a variety with very dark purple flowers which makes a striking contrast to most of the other shades. Blooms in the fourth week of May.

S. vulgaris, Michel Buchner.—Double. A very free blooming variety with trusses above the medium size, and having large double flowers of a fine pale shade of lilac, the buds being of a rosy hue. Blooms during the fourth week of May. One of the best.

S. vulgaris, Furst Liechtenstein.—Single. Truss and flowers large, the latter being of an attractive lilac colour with a pinkish shade. A fine variety.

S. vulgaris, Madame Abel Chatenay.—Double. This is the finest double white lilac which has bloomed here. The trusses are of good size and the flowers double, pure white and of good substance. It is a most attractive variety and should be in every collection. Another double white variety called Madame Casimir Perier is said to be better, but this has not bloomed here yet.

S. vulgaris, Charles Baltet.—Double. A very free blooming variety with large flowers which are purplish lilac in the centre and approaching a pink shade towards the outside. Blooms in the last week of May.

S. vulgaris, La Tour d'Auvergne.—Double. This variety is at its best when part of the flowers are open and some still in bud, as there is a great contrast in the colour of the bud and the expanded flower. There are several shades of lilac in this variety, varying from light to dark. Blooms in last week of May.

S. vulgaris, Comte Horace de Choiseul.—Double. A free blooming double variety with a compact truss and attractive lilac flowers. Blooms in the fourth week of May.

S. vulgaris, Alba Grandiflora.—Single. This is a great improvement on the common white lilac, being a much freer bloomer and having a large truss and larger flowers. Very good. Blooms during the fourth week of May. Frau Bertha Damman is another fine single white variety.

S. vulgaris, Dr. Maillot.—Double. This is the latest flowering of all the varieties of *S. vulgaris* which have blossomed here and is one of the best. It is a free blooming variety with large trusses and exceptionally large double flowers of a very delicate pinkish purple. At its best during the first week of June. Very desirable for keeping up a succession of bloom.

Syringa oblata, Lindl.—This species was introduced to cultivation in 1859 and is a native of China. The foliage of this lilac is very attractive, the leaves being large and of a dark, glossy green colour ; their shape also differs very much from other species, being heart shaped. The flowers are not unlike those of the common lilac, but have more of a pinkish tinge than most of the varieties of that species. Desirable on account of its attractive foliage. There is said to be a white variety of this species, but it has not yet been tested here.

Syringa persica, L. (Persian lilac).—This species, as its name indicates, is a native of Persia, and was introduced to cultivation in 1640. It is not as robust a grower as the common lilac nor evidently as hardy, having gradually died out at the Experimental Farm. It is a small growing species, usually only reaching a height of five or six feet. The leaves are smaller than those of the common lilac which give it a more graceful habit. The flowers are of a bluish purple colour, not particularly attractive, and are borne in loose panicles. This species blooms during the fourth week of May while the common lilac is still in flower. There is a white and a cut-leaved variety, neither of which have yet done well here.

Syringa chinensis, Willd (Rouen lilac).—Thought to be a hybrid betwen *S. persica* and *S. vulgaris,* of which it has more the character of the former. It was introduced in 1795. Other names for this lilac are *S. rothomagensis* and *S. dubia.* This is a beautiful species, being a much stronger grower than *S. persica* and having better coloured flowers. It grows from six to eight feet in eight and has foliage intermediate in character between *S. persica* and *S. vulgaris.* It is a very free bloomer, the flowers being borne in large, loose panicles and are of an attractive purplish violet colour. It blooms a little later than the Persian, but at the same time as some of the varieties of the common lilac.

Syringa Josikœa, Jacq. Josika's lilac.—Closely following the common lilac in time of blooming is this species, which is a native of Hungary, introduced to cultivation in 1835. If this species flowered at the same time as the common lilac it would

not be as valuable, but it begins to bloom about the 1st of June when most of the varieties of the common lilac are over. It is a robust species and attains a height of ten feet. The foliage is deep green and the leaves large, thick and very glossy, making it quite attractive. The flowers are bluish purple and have no perfume and are not borne in as large trusses as the common lilac. This is a desirable species on account of its giving a succession of bloom and for its fine foliage ; it also makes a very good hedge plant, forming a stiff row and being very attractive on account of its glossy foliage.

Syringa Bretschneideri.—This is a species somewhat resembling *S. persica,* but is more upright in growth, more vigorous and hardier and with handsome foliage. By some authorities it is said to be *S. Emodi rosea* It is, however, quite distinct from anything else growing here. It is not of special merit as it blooms about the same time as some of the best varieties of the common lilac. The flowers are somewhat the same colour as the Persian, being a bluish purple.

S. villosa, Vahl.—A native of Northern China, and introduced in 1880. It is a strong grower and said to reach a height of six feet, though from present indications it will grow a little taller than that here. The leaves are rough and rather coarse looking, but this tends to make the shrub more striking. It flowers during the second week of June, closely following *S. Josikœa.* It is a free bloomer, the flowers, which are not highly perfumed, being pale bluish pink and the clusters of good size. This is a very desirable species.

Syringa Emodi, Wall.—A native of the Himalayan mountains, and introduced in 1840. There is very little difference between this and *S. villosa* as grown here, although those labelled *S. Emodi* have not proven so hardy and the leaves are larger. There is a variety, *rosea,* of this species and also one with variegated leaves.

Syringa pekinensis, Rupr.—This species is a native of Northern China, and was introduced in 1886. It is also sometimes called *Ligustrina pekinensis,* Regel. This species has not bloomed here nor proven perfectly hardy so far. There is a pendulous variety of it.

Syringa amurensis, Rupr.—A native of Manchuria and Japan, and introduced in 1863. It is a strong growing shrub and might be called a small tree, as the tendency is to have only one stem. It is of a moderately spreading habit and has attractive, clean looking foliage. The flowers are quite different from most of the other species, the individual blooms more resembling those of the privet. They are creamy white and borne in large, loose panicles, and also in smaller and more compact ones. This lilac begins to bloom about the beginning of the fourth week of June and is very striking.

Syringa japonica, Decne.—The Japanese lilac, sometimes known as the tree lilac, is a native of Japan, as its name indicates, and was introduced in 1885. It is very similar in habit of growth to *S. amurensis,* as grown here, the panicles of flowers, however are larger and more compact. It blooms more than a week later than that species, not being at its best until the first week of July. Both this and *S. amurensis* are very desirable. These close the lilac season.

Chemical Laboratory, Central Experimental Farm, Ottawa, Ont.

REPORT OF THE CHEMIST

(FRANK T. SHUTT, M.A., F.I.C., F.C.S., F.R.S.C.)

OTTAWA, December 1, 1901.

Dr. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith the fifteenth annual report of the Chemical Division of the Experimental Farms. It will, I believe, be found to contain much of interest and value to the Canadian farmer, dairyman, and fruit grower. As formerly, the investigations carried on by this Division and now reported upon, though necessarily of a scientific nature, have been undertaken with the object of obtaining information of a practical character, and in this respect we have met with a very fair measure of success. The researches and analyses made relate to many of the various branches of agriculture, and hence our results should be found useful to a wide circle of readers.

As it would be quite impossible to give a detailed account of all the work accomplished in the Farm laboratories, we have inserted only the results of those investigations of greater importance and general interest, and which in a measure may be said to be completed. The nature and scope of the work is outlined in the following summary.

Soil Investigations.—These include the complete chemical analysis of certain representative soils from British Columbia, Ontario, Nova Scotia, and Prince Edward Island. The most important of the series examined, perhaps, are the examples from reclaimed marshes at the head of the Bay of Fundy. Among other interesting features, certain differences in character and composition between the newly deposited soils and those which have been for many years in cultivation, have been pointed out.

Soils representative of the Spallumcheen Valley, Okanagan, B.C., have been submitted to careful analysis, and suggestions made regarding the culture and maintenance of fertility of this most productive area.

A special examination for lime has been made in certain instances, to ascertain if there were any deficiency in this element. Soils from British Columbia and Quebec are reported on in this connection.

In connection with the question of the conservation of soil moisture, we instituted this year a series of experiments in the orchard of the Central Farm, Ottawa. The moisture was determined in the soil, (*a*) under cover crop, and, (*b*)under cultivation, to a depth of 14 inches once a fortnight throughout the season. The results are as interesting as those obtained last year from the soils on the Experimental Farms at Indian Head, N.W.T., and Brandon, Man., though differing somewhat in character, and will be found useful towards an understanding of the best modern methods of orchard tillage.

Fertilizers.—The substances reported upon under this caption are chiefly of the order which we have in previous reports designated as 'naturally occurring,' and include mucks, muds, limestone, factory wastes, wood ashes, sea-weed, &c.

Fodders and Feeding Stuffs.—The larger part of the work of the year has been in connection with these materials. We are, consequently, able to present results on the following important problems:—1. The changes in the composition of roots during storage. 2. The food and fertilizing values of the yields obtained from clover and

alfalfa by two and four cuttings, respectively. 3. The feeding values of (*a*) corn, and (*b*) clover, before and after ensiling. 4. The amounts of dry matter and sugar in farm roots.

In addition to the foregoing, we have examined sugar beets grown in the North-west Territories, Manitoba and Prince Edward Island.

The recent increase in the price of meals and 'concentrates' in general has caused a keen interest on the part of farmers and dairymen in the comparative feeding values of the various milling by-products upon the market and much correspondence has been received on this subject. There is a desire on the part of many feeders to have the composition of the high-priced by-products—as regards protein and fat contents—stated by the manufacturers. It may be remarked that in several of the United States a law to this effect is in force, and the request appears to be a reasonable one. If it is considered desirable or necessary to afford protection to the purchaser of plant food in commercial fertilizers, it may well be argued that it is equally desirable and necessary to protect the interests of those buying animal food in the more expensive forms (gluten meal, &c., &c.) now coming into such extended use. In tabular form we present the analytical data obtained on a series of samples of germ meal, gluten meal and other important by-products in the manufacture of corn starch and glucose, examined in the laboratories here during the past year. Many of these materials are seen to have a high feeding value, but a consideration of the whole shows that there is sufficient difference in their nutritive qualities to make this inquiry one of importance.

Insecticides and Fungicides.—Analyses have been given of several brands of lye used in Canada and recently examined by us, as well as of certain other compounds used in the preparation of spraying mixtures.

Soft Pork Investigation.—The analytical work in connection with this research was brought to a close in May of the current year. The compilation of the data, which were very voluminous, and their consideration necessarily occupied a considerable time, so that it was well on in the year before the results and the deductions therefrom were ready for the press. We are glad to state, however, that in Bulletin No. 38, of the Farm Series, our conclusions from this important investigation have now appeared and been distributed. It is gratifying to note that this work has received the commendations of many engaged in pig raising and the pork packing industry, as well as the agricultural press.

Grass Pea (Lathyrus sativus).—It being held by some that the seed of this plant, which is now somewhat extensively grown in parts of Ontario, possessed poisonous qualities, a very thorough search was made by chemical means, but with negative results. This pea was also fed, almost exclusively, under our immediate supervision for some weeks to fowls, but no injurious effects could be observed.

Well Waters from Farm Homesteads.—A tabulated statement is given of the data obtained upon the samples submitted to analysis, together with a brief report as to the wholesomeness of the waters. It is gratifying to note that on comparing these results with those of former years, there appears to be a decided improvement in the quality of farm waters.

It seems again necessary to point out that instructions as to collection and shipment should be obtained before sending samples, in order to avoid mistakes that frequently render the analysis valueless.

Investigations in Progress.—A considerable amount of work has been done on the analysis of honey, chiefly with the view of distinguishing between ripe and unripe samples. It has been discovered that the ordinary analytical methods in vogue for determining the percentage of water in this article are defective and do not yield accurate results. Further work is necessary, and it is confidently hoped that during the coming year we may be able to perfect our processes. We shall then be in a position to furnish reliable information as to the composition of Canadian honey and to ascertain what differences may exist between the ripe and unripe product.

Another matter receiving attention is the comparative feeding value of fodder corn grown in hills and drills, respectively. Four well known varieties with this end in view are now in course of analysis.

Tuberculin.—We have, as in former years, prepared and forwarded tuberculin to the Dominion veterinary surgeons. During the twelve months ending November 30, 1901, 6,780 doses have been sent out.

Correspondence.—The letters received by this Division, in addition to those referred to us by the other departments of the Farm, numbered 1,213, from December 1, 1900, to November 30, 1901, and during that period 1,127 were despatched.

Samples Received for Analysis.—In the subjoined table will be found information as to the number and character of the samples received for examination. The number exceeds that of past years, and points to the popularity of this branch of work. As the demands upon our time increase, it is necessary to point out that the examination of such samples can only be undertaken as opportunity permits, and that the experiments instituted on the farm must, necessarily, have first attention. As far as is possible, help will be furnished as heretofore in this matter, but we must counsel patience and consideration on the part of our correspondents.

SAMPLES Received from Farmers for Examination and Report, November 30, 1900, to December 1, 1901.

Samples.	British Columbia	North-west Territories.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.	Number still awaiting examination.
Soils	20	4	2	72	15	5	5	4	127	27
Mucks, muds and marls	3	....	1	6	2	....	12	15	39	11
Manures and fertilizers	1	1	...	3	....	1	7	4	17	3
Forage plants and fodders	1	5	15	111	1	....	2	18	153	2
Well waters	3	3	14	37	10	12	2	15	96	0
Miscellaneous, including dairy products, fungicides and insecticides	2	7	2	40	11	1	4	2	69	9
Totals	30	20	34	269	39	19	32	58	501	52

Acknowledgments.—To the assistant chemists, Mr. A. T. Charron, M.A., and Mr. H. W. Charlton, B.Sc., I would again heartily tender my thanks for much valuable assistance during the past year. By their assiduous labours and their intelligent interest in the various investigations, has it alone been possible to overtake the work of this Division and to present the information contained in this report.

I am also much indebted to Mr. J. F. Watson, for most efficient help in connection with the correspondence and other clerical work of the Chemical Division. As in past years, his duties have been performed in a most careful and painstaking manner.

I have the honour to be, sir,

Your obedient servant,

FRANK T. SHUTT,

Chemist, Dominion Experimental Farms.

SOIL INVESTIGATIONS.

BRITISH COLUMBIA.

Spallumcheen Valley.—Our attention having been directed to the desirability of ascertaining the nature and possible deficiencies of the soil of this district, we obtained through the kindness of Mr. Donald Graham, of Armstrong, B.C., two samples, representative of the surface and subsoil, and accompanying which we received the following particulars and information. Mr. Graham writes : 'The two samples represent the Spallumcheen Valley as a whole. The soil was originally very rich and productive. It is still strong, although certainly failing somewhat in productiveness. We should like to know what it requires particularly to bring it up again, though perhaps not so much to bring it up as to keep it from failing any more. No. 1 is a black loam and covers this valley generally from a very slight covering in places to a depth of sometimes a foot or two. It has been cultivated for the past twenty years. No. 2 is the subsoil of the valley, but in places where coming to the surface it has been productive, although much harder to cultivate than No. 1. In such parts of the valley where there is not much (surface) loam, the soil is getting yearly harder to cultivate. The sample sent was taken from beneath the black loam forwarded, at a depth of a foot or more, and consequently I presume it to be richer than the clay that has been reached by the plough and cropped.'

Analysis of (air-dried) Soils.

	No. 1. Surface soil	No. 2. Subsoil
Moisture	3·80	3·81
Organic and volatile matter	12·28	7·70
Clay and sand (insoluble in acid)	65·46	63·51
Oxide of iron and alumina	15·80	21·15
Lime	·69	·82
Magnesia	·09	1·21
Potash	·83	1·09
Phosphoric acid	·23	·16
Soluble silica	·09	·05
Carbonic acid, &c. (undetermined)	·73	·50
	100·00	100·00
Nitrogen in organic matter	·415	·161

Available Constituents in Surface Soil.

	p. c.
Potash	·029
Phosphoric acid	·028
Lime	·316

No. 1. The chemical data give evidence of a high degree of fertility. Judged by the standards suggested by Dr. Hilgard, as well as those we have previously established from the examination of Canadian soils, I should conclude that this soil was well supplied with all the more important constituents of plant food. Indeed, it appears to the writer as a soil of more than average richness.

Further, the proportion of the mineral elements potash, phosphoric acid and lime, more or less immediately available, are very satisfactory, so that with a sufficient supply of moisture excellent crop yields should be obtained.

Towards the maintenance of its fertility we should counsel the application from time to time of an organic manure, and in this connection the growth and turning under of clover in districts where there is sufficient moisture to obtain a good 'stand,' offers itself as one of the most economical methods. The growth of the clover would no doubt be encouraged, and the land much improved, by a dressing of a fertilizer con-

taining lime and potash. Since marl (carbonate of lime) is obtainable in the neighbourhood, it might be tried, though if first burnt its effect will be more immediate. The continued or excessive use of quick lime, especially if unaccompanied by other manures, is not to be recommended, for though such treatment might give larger yields for a few years, it would tend eventually to exhaust the soil. The value of clover as a fertilizer has in past reports been fully dealt with in all its phases, and it is only necessary to remind our readers that clover is a moisture-loving plant, and consequently it is practically impossible to ensure its vigorous growth unless the soil contains a sufficiency of moisture. It is possible that alfalfa, being a deeply-rooted legume, might give a better return than clover, but being of a slower and somewhat more difficult growth, it does not offer itself as a desirable substitute for the purposes of 'green manuring,' when the land is being worked under a short rotation. The question of rotation is also one that has much to do with the maintenance of fertility, for there is no doubt that land continuously under one crop—and especially one demanding the active cultivation of the land and making great demands on the store of available plant food—will fall off in productiveness much more quickly than one under a system which calls for a due succession of crops.

The physical texture of this soil, judged from the sample forwarded, appears to be excellent, no doubt due largely to the favourable proportion of organic matter present. A mechanical separation shows, approximately, 55 per cent of coarse sand—a fact that places it in the category of soils well adapted to general cultivation.

No. 2. In the larger number of the determinations this subsoil shows that plant food is abundantly present, though the fact that the soil bakes into hard masses indicates that drainage is desirable, and that a dressing of lime would be beneficial.

ONTARIO.

Welland County.—Two samples of soil from South End, Welland county, and which were fairly representative of the cultivated lands of the district, have been examined with a view of obtaining information as to their character, their possible deficiencies and most economic methods of treatment. Most of the soils in this district—which has long been favourably known as adapted to fruit growing—have been tilled for a number of years, and consequently where not kept up with manures they are to be considered as 'partially exhausted.' It is of the latter order that the soils examined are to be considered.

Our correspondent in forwarding the samples furnishes the following particulars regarding them:—'No. 1. This has been in grapes for several years, perhaps twelve. To my knowledge it has not received any manure or fertilizer for at least four years, and probably for a still longer period. It has been well cultivated. It would average about one foot in depth, and is underlaid by a heavier clay. No. 2 was cropped—blue grass and timothy—three or four years prior to 1897, when it was ploughed and sown to fall wheat; crop, 20 bushels to the acre, 1898. Oats, 1899, potatoes and turnips, and trees (orchard) planted in 1900 with no crop, but well worked. Subsoil, clay, as in No. 1.'

Analysis of (air-dried) Soils.

	No. 1. Grapery.	No. 2. Orchard.
Moisture	1·23	1·47
Organic and volatile matter	4·91	7·07
Clay and sand (insoluble in acid)	84·25	81·74
Lime	·23	·32
Potash	·35	·39
Phosphoric acid	·10	·11
Nitrogen, in organic matter	·126	·231
Available phosphoric acid	·0112	·0141
Available potash	·0098	·0195
Available lime	·110	·188

A mechanical separation of the clay and sand showed that No. 1 contained 62·70 per cent, and No. 2, 70·00 per cent, coarse sand. They are, therefore, to be considered essentially as sandy loams.

Judged from the chemical standpoint, No. 2 is the better soil, being richer in organic matter and nitrogen, in addition to showing somewhat larger percentages of lime, potash and phosphoric acid, more especially in the available condition. The reason for the better quality may, perhaps, be found in the well known fact that land under active cultivation loses in fertility much quicker than that in sod—indeed, the latter if pastured, will improve, more particularly in available constituents.

No. 1. The data indicate that as regards mineral constituents this soil is below the average of fairly fertile soils, and that for most crops the application of a fertilizer containing all three elements—potash, phosphoric acid and lime—would prove beneficial. The soil has a distinctly acid reaction, due, no doubt, in large part to deficiency in lime, and, therefore, wood ashes or Thomas' slag and a potash salt are suggested as fertilizers.

No. 2. This soil is of fair average quality and should give good returns. It could, however, be improved by treatment such as suggested in the preceding paragraph.

Speaking generally of such soils, we should say that being somewhat sour and naturally deficient in lime, an application of lime—or, better still, a fertilizer furnishing not only lime, but also phosphoric acid and potash—would be advantageous. As a source of phosphoric acid, Thomas' or basic slag could be advised.

Further, to improve tilth and absorptive capacity for moisture, both soils, but especially No. 1, would be the better for an organic manure, and especially one which would at the same time increase the store of nitrogen. The growth and turning under of clover furnishes an economical means to that end.

NOVA SCOTIA.

Marsh Soils from the Bay of Fundy.—Among the most valuable and fertile soils of Nova Scotia and New Brunswick are the reclaimed salt marsh lands which border on the Bay of Fundy. Many of these have produced, for a long term of years, without the application of any manure, remunerative yields of hay, and consequently are soils justly esteemed in the maritime provinces as of the highest agricultural importance. Besides their suitability for the raising of hay, many, no doubt, by reason of their composition and texture, are capable of giving profitable returns in ordinary field and market garden crops.

The salt marsh areas, before being dyked and drained, may present one of several aspects. Frequently they appear as bare deposits of tidal mud, the depth of which may be many or only a few feet. This is generally full of the undecomposed remains of eel grass (*zostera marina*), a plant of little direct agricultural value, but of the greatest service in the formation of these marshes, and in supplying their soils with organic matter. At other places, these marshes are found covered with a thick, matted sod resulting from the growth of salt grasses that followed the eel grass and overlying the tidal deposit.

Dyking to keep out the sea-water, and thorough drainage to remove the salt and excess of water, are the two initial processes necessary towards reclamation. Once these are effectively accomplished, the land is easily brought into cultivation, and is found, as already stated, to be most productive. It is the practice of some farmers to occasionally let in the tide for a short period, so that the soil may be recovered for a time. This plan, though it rejuvenates the soil, necessitates the lapse of a year or two, to allow the washing out and carrying away of the salt with which the sea water has impregnated the land. Marshes from which the salt has not been removed will not grow timothy, and the quality of the salt grasses produced is of a decidedly inferior character.

In several of the past reports of this Division, analyses have been given of the marsh 'mud' as deposited by the tide, and which is very generally used on all lands adjoining the Bay of Fundy, as an amendment or fertilizer. Hitherto, however, we have not had the opportunity of making any systematic examination of the soils of the reclaimed marshes. This important work has, through the co-operation of Professor Wm. F. Ganong, been partially accomplished during the past year, and the analytical results obtained are here presented.

The samples, five in number, were collected and forwarded by Professor Wm. F. Ganong, who for some years past has been making a critical study of the reclaimed salt marshes which lie at the head of the Bay of Fundy. It was thought by him that there might be some relationship between the character and composition of these soils—which have all been deposited by the tide—and their vegetation, and that a knowledge of this relationship might be of economic, as well as scientific, value. Recognizing the significance of this conjecture, and knowing that large and important agricultural interests are closely identified with these reclaimed marshes, both in New Brunswick and Nova Scotia, the analysis of these soils was undertaken. The data are not only exceedingly interesting from a scientific standpoint, but are of value in indicating the character of these soils and in furnishing information that may be of use to the practical farmer as to the best treatment of these marshes.

The following particulars are furnished by Professor Ganong :—

Description and Location of Soils.—No. 1. Marsh land. From near Aulac river, opposite Pointe de Bute. Has yielded heavy crops of timothy and associated grasses for at least forty years without ploughing, tiding, fertilizing or other cultural treatment.

No. 2. Soil from low part of marsh producing very poor grass. Patches surrounded by very good grass. Near Missequash river, opposite Pointe de Bute. Here and there on the good marsh are areas of a few square yards on which there is a poor growth, and this No. 2 is a sample from one of these. Deposit very deep, known to be twenty feet or more.

No. 3. Mud freshly brought in and laid down by the tide at mouth of Tantramar river, on a piece of marsh being newly 'tided.' A sample of the deposit of which the entire marshes are built ; the original marsh material unaffected by any vegetation.

No. 4. Blue clay, from 18 inches below the surface in a damp place inside the company's canal, near Missequash river, above Pointe de Bute. The red mud changes to this where drainage is poor. It then bears a coarse, nearly useless, vegetation. Deposit, many feet deep. Extremely poor soil and needing improvement.

No. 5. Brown mud, from 2½ feet below the surface, inside the company's canal, near Missequash river, above Pointe de Bute. Being thus below the surface, this soil has never borne crops directly, though it is penetrated by roots of the grass on the ordinary cultivated marsh land above. Deposit is many feet deep.

On arrival at the laboratory, the following notes were made on the samples, all of which were in an air-dried condition :—

No. 1. Of a distinctly red colour ; in small lumps easily broken between the finger and thumb, and containing a considerable amount of root fibre. For a marsh soil, it has the appearance of being in a very fair mechanical condition, though possibly it might be improved in this respect by drainage.

No. 2. In larger and less friable lumps than No. 1, of a grayish-blue colour with streaks of reddish soil through them. The colour and condition point to insufficient aëration, resulting no doubt from the drainage being imperfect.

No. 3. In layers something like shale, one-eighth to one-fourth inches in thickness, distinctly red, and easily broken. Has more the appearance of a rock than a soil.

No. 4. In exceedingly hard, tenacious lumps, bluish-gray, but showing many streaks of a greenish-yellow colour.

No. 5. In reddish lumps, easily broken. Not unlike sample No. 1, but not showing any root fibre.

The samples for analysis were made on the 'fine earth' prepared by first removing all fibre and pebbles and then grinding and seiving the remainder. In the determination of the 'total' constituents, hydrochloric acid, specific gravity 1·115, was used as a solvent, digesting the soil for 10 hours at the temperature of the water-bath. For the estimation of the 'available' potash, phosphoric acid, and lime, 1 per cent solution of citric acid was employed, digesting in the cold for 5 hours with frequent agitation.

CHEMICAL Analyses of Soils from the Head of the Bay of Fundy, 1901.
Results calculated on water-free Soils.

No.	Organic and Volatile Matter.	Clay and Sand.	Oxide of Iron and Alumina.	Lime.	Magnesia.	Potash.	Phosphoric Acid.	Soluble Silica.	Carbonic Acid (undermined).	Total.
1..	6·54	75·29	14·72	·239	·513	·817	·136	·091	1·654	100·0
2.........	10·60	73·18	12·64	·234	·397	·852	·124	·059	1·914	100·0
3...........	6·02	75·83	13·79	·652	·283	·902	·146	·063	2·314	100·0
4...........	6·77	76·01	14·01	·409	·183	·996	·094	·056	1·472	100·0
5...........	3·10	84·48	9·87	·288	·154	·646	·110	·063	1·289	100·0

No. (*Continued.*)	Nitrogen.	Available Elements.			Reaction.
		Potash.	Phosphoric Acid.	Lime.	
1..........	·182	·0088	·0260	·0626	Acid.
2..........	·338	·0340	·0160	·0449	"
3..........	·122	·0748	·0466	·3970	Neutral.
4..........	·106	·0073	·0436	·0792	Acid.
5..........	·062	·0300	·0354	·1080	"

The data in the subjoined table have been furnished by Professor Ganong. They give the proportions of the various soil-forming constituents in the example under investigation.

Mechanical Analyses of Marsh Soil.

—	I. Timothy land unploughed and cropped over 40 years	II. Low places in hay marsh where agrostis grows.	III. Brought in fresh by tide.	IV. Blue clay from 18 in. below surface.
Water	2·200	2·600	1·800	3·160
Organic matter........	6·505	10·920	6·200	7·360
Gravel	·025	....	1·125	·125
Coarse sand........	·275	·400	3·100	·325
Medium "	4·125	·285	2·025	2·400
Fine "	9·360	1 900	4·225	6·210
Very fine "	22·185	1·300	45·275	33·885
Silt........	36·165	50·110	14·125	20·375
Fine silt........	10 390	17·735	12·400	10·865
Clay........	8·585	10·530	9·660	15·200
	99·815	95·780	99·935	99·905

The proportion of Salt in Marsh Soils.—Since the fertility of marsh depends in a large measure upon the thoroughness with which the common salt has been eliminated, a determination of this constituent was deemed advisable. The percentages obtained are as follows, and represent the amounts present in the water-free soils :—

	Common salt per cent.
No. 1	·037
No. 2	1·048
No. 3	4·16
No. 4	·939
No. 5	·217

Conclusions and Suggestions.—No. 1. As regards humus (organic matter) and nitrogen, this soil would compare well with those of fair average richness, the percentages of nitrogen in such usually being between ·1 and ·2 per cent.

The lime-content agrees with that found in many Canadian sandy loams of average fertility, which as a rule lies between ·1 and ·3 per cent. It cannot, however, be considered as rich in this constituent.

The total potash in this, as in the other members of the series, is much higher than in most of our virgin soils. It most probably exists in the form of double silicates, and would be gradually liberated in an assimilable condition under good methods of soil culture and favourable climatic conditions.

The percentage of phosphoric acid is somewhat lower than that in Canadian virgin soils of average fertility, but as we shall see shortly, a large proportion of this is in an available form.

This soil, as also Nos. 2, 3 and 4, is characterized by a large percentage of oxide of iron a feature that frequently betokens, when the iron is fully oxidized (by aëration which follows efficient drainage and good cultural methods), a favourable condition for plant growth.

The immediate fertility or crop-producing power of a soil as contrasted with that which is latent, is measured by the percentages of the essential elements necessary for plant nourishment that are available, rather than by the percentages extracted by hot hydrochloric acid—the solvent employed in the usual methods of analysis. The amounts of the so-called available elements are obtained by using an acid solution which is approximately equal in solvent power to that exuded by the roots and rootlets of plants. Such a solvent is a 1 per cent solution of citric acid.* By this method, known as the Dyer method, after the chemist who introduced it in 1894, this soil (No. 1) appears to be fairly well supplied in available phosphoric acid, but somewhat below the average of fertile soils as regards available potash, probably resulting from its removal by the hay crop during the long term of years the marsh has been cut. Further, it seems probable that this soil is somewhat deficient in its store of available lime.

In character, it may be classed as a sandy loam, containing fair proportions of clay and organic matter.

It is exceedingly interesting and satisfactory to note that in this soil the salt has been so thoroughly washed out. Of all the samples it contains the least. The extent to which this removal has taken place will be evident on comparing the percentage in this soil (·037) with that in No. 3 (4·16), which is newly laid down marsh.

Considered generally, we might prejudge the soil as one capable of yielding good crops under favourable climatic conditions, but one also that might have its productiveness increased by occasional manurings and thorough drainage where necessary to

*A full discussion of the character of many Canadian virgin soils, standards of fertility and methods of analysis, is to be found in the Report of the Chemist of the Experimental Farms, 1897.

improve its mechanical condition. Were we asked to make suggestions regarding the nature of the manures to be used we should advise, since it is hay land, the sowing of clover from time to time, which would enrich the soil in humus and nitrogen, and a dressing of bone meal 200 pounds, superphosphate 100 pounds, and muriate of potash 75 pounds, these quantities being for one acre. It is quite probable that a simple dressing of lime, 20 to 40 bushels per acre, might much increase the yield.

No. 2. Though in many features this soil is similar to No. 1, there are certain data which show it to be richer in plant food. Thus, in nitrogen and organic matter, the percentages are almost double those in No. 1. It is also much richer in total and available potash. The phosphoric acid, however, present in the available condition is considerably less than in the preceding sample.

With better drainage, through aëration, and good culture, this soil should give returns equally as good as those from No. 1. There is no evidence of any particular want of plant food or of the presence of any deleterious compounds, save those which naturally form in a water-logged soil from which the air is excluded.

We are of the opinion that in addition to drainage and aëration, an application of lime would prove of benefit, sweetening the soil and converting the poisonous iron compounds, formed by the causes mentioned in the preceding paragraph, into innocuous forms.

The comparatively speaking large amount of salt present strongly indicates poor drainage, and serves to support the view taken that the requirements of this soil are mechanical rather than chemical.

No. 3. This sample is of particular interest as furnishing data regarding the composition of the tidal deposit as laid down. It seems to contain both mineral and organic constituents in very fair quantities, and gives evidence of possessing all the requisites for forming a good arable soil under suitable treatment.

On comparing the amounts of the organic matter and nitrogen of freshly deposited marsh with those of old marsh soil (No. 1), it will be observed that the latter is somewhat the richer in these constituents. This agrees with the generally accepted view, that in soils under sod continuously the percentages of humus and nitrogen tend to increase.

The percentage of lime is nearly three times that in soils Nos. 1 and 2, and seems to indicate that the 'mud' as deposited is richer in this element than the marsh lands are after years of cultivation. If this is the case, an explanation is furnished in the fact that a considerable quantity is annually withdrawn by the crop. We, further, are aware that lime has a tendency to 'work down' into the subsoil. This soil, it will be noticed, is the only one of the series that does not show acidity, a very significant fact.

The amount of salt, as might be expected, is very high. That, however, it can be readily removed through drainage has been already shown.

No. 4. While the percentages of plant food, with the exception of potash, are not equal to those of many soils of good average fertility, there are no undesirable features save the 'sourness' of the soil and its very bad mechanical condition, both of which are capable of removal or improvement by drainage, aëration and the application of lime. Its chief deficiencies, if such they may be called, are nitrogen and phosphoric acid.

The necessity for better drainage is emphasized by the amount of salt present, nearly 1 per cent.

No. 5. From the position of this sample, it must be regarded as of the nature of a subsoil, and consequently its very small percentages of nitrogen and organic matter are not to be considered as abnormal. This sample presents many similarities to the other soils of this series, though there are notable differences between this and the four preceding soils in the much smaller percentage of oxide of iron it possesses.

PRINCE EDWARD ISLAND.

Marsh Soil.—Respecting this reclaimed land, the inquiry is received : 'Will timothy and clover thrive upon it ?' Mr. Richard Egan, of Mount Stewart, P.E.I., in sending the marsh soil for analysis says: 'The land was formerly flooded by salt water. Some three years ago an aboideau was constructed, and for two years after good crops of marsh hay were taken from it. Now there is hardly any crop—the marsh grasses are apparently dying. There are over 500 acres of this land owned by different farmers, who are at present suffering a great loss.'

When received, the sample consisted of granular masses and a small amount of powder, of a light gray colour, mixed with many fragments of vegetable fibre, chiefly of eel grass. From the appearance and construction of the soil particles it would seem as if they were formed by the deposition of a fine silt about the partly disintegrated fibre. The whole was of a very loose, light texture.

To ascertain, if possible, the cause of the alleged sterility, we made an examination of the soil and obtained the following data:—

Analysis of (air-dried) Marsh Soil.

Moisture	3·29
Organic and volatile matter	15·79
Mineral matter, insoluble in acid	60·10
Mineral matter, soluble in acid	20·82
	100·00
Lime	·31
Nitrogen	·45
†Common salt	·31
*Sulphate of lime	·93

†Calculated from chlorine. *Calculated from sulphuric acid.

It would appear from these figures that as regards nitrogen and humus there is no deficiency ; indeed, the amounts present show that in these constituents the soil is particularly rich, though no doubt much of the nitrogen is not in an assimilable condition.

No determination of the percentages of the potash and phosphoric acid present was made, but we feel assured from past work upon virgin marsh land that the trouble cannot be due to lack of these elements.

The amount of lime, ·31 per cent, indicates that this element is not wanting.

The soluble chlorides and sulphates (common salt, sulphate of lime) present, though not excessive, would suggest the desirability of more thorough drainage if timothy and clover are to be sown. Possibly a fair growth of the cultivated grasses could now be obtained, and every succeeding season, provided the showers can wash out and carry away the salt, the conditions for their development would be improved.

The skilful culture or working of the land, in addition to drainage, would no doubt assist in bringing about that texture or mechanical condition of the soil necessary to the vigorous growth of timothy and clover. At present it seems to be too light and porous, and though these qualities are conducive to the sweetening and aëration of the soil, a firmer and more compact tilth is desirable for cultivated grasses. To this end it might be desirable to cultivate the land one or two seasons with a root crop, furnishing sufficient manure to give the young plants a good start.

There is another course open, but it means the growing of the coarser, less nutritious salt grasses. If the marsh were flooded, the probability is that much of the apparently dead marsh grass would revive, and in a season or two a good crop of hay procured. This method would, of course, preclude the possibility of growing timothy and

clover, and we should therefore advise a careful scrutiny of the marsh and the trial of timothy and clover on the better drained portions, before resorting to the latter plan and letting in the salt water. Though possibly there may be marked differences in the qualities of these tidal deposited soils, we do not know of any instance where the land has not yielded to a proper and thorough system of reclamation, giving remunerative crops of cultivated grasses as soon as the salt has been sufficiently washed out and the soil become well aërated and, in such cases as this, well compacted.

SOILS EXAMINED FOR DEFICIENCY IN LIME.

Many soils are received respecting which information is merely sought as to their richness in lime, so that their future treatment as regards this form of plant food may be in accord with the best practice. These samples, as a rule, are tested qualitatively, and from the results obtained an opinion is forwarded as to the necessity or desirability of a lime application. Occasionally, however, when these soils are representative of large areas they are submitted to a quantitative analysis, estimating the total lime, and also the proportion soluble in 1 per cent citric acid, which we must suppose indicates approximately the amount readily available to plants. We may insert the analysis of a few of these, since the placing on record of the data will make them available for future reference.

Labelle County, Quebec.—Three clay soils sent by the Hon. W. Owens, Montebello, and considered as deficient in lime:—

	Total Lime.	Available Lime.
No. 1	·462	·448
No. 2	·791	·089
No. 3	·679	·116

No. 1. This appears to be a fairly good soil, though capable of improvement, probably by judicious culture. It contains a considerable amount of humus (organic matter) and nitrogen, and I should judge, is by no means deficient in the other elements of plant food.

Regarding its lime content—the chief object of this inquiry—our results show a fair, though not large, percentage. Analysis further indicates that by far the larger quantity of this lime is in a more or less readily available condition. Though one cannot speak positively, the data do not indicate that the soil stands in need of a dressing of lime.

No. 2 and No. 3. Clay loams are similar soils, though I should consider the latter somewhat the more refractory of the two. Both, in my opinion, would be benefited by an organic manure (barn-yard manure or clover turned under) and an application of lime. It will be noticed that, though these soils contain a larger percentage of total lime than No. 1, their percentage of available lime is very much less. They give a faintly acid reaction to litmus paper, a fact which confirms the deduction from the available lime estimation. From a mechanical as well as a chemical standpoint, I think lime would improve these soils.

Enderby, Kamloops Division, E. Yale, B.C.—The soil is a stiff clay, and is described by Mr. Frank Hazard, who sends the sample, as 'rich wheat land, giving heavy crops.' It is, however, 'very difficult to work, and can only be ploughed in dry weather. It breaks down with the frost.' When received at the laboratory, it had dried into hard, refractory lumps and masses. Information is sought as to what may be added to the soil to improve its texture and render it more easily worked.

A partial analysis afforded the following data:—

Moisture	7·18
Organic and volatile matter	10·59
Oxide of iron and alumina	24·68
Lime	1·21
Nitrogen in organic matter	·301

An estimation of the lime soluble in 1 per cent citric acid solution gave ·075 per cent.

As regards nitrogen, the soil must be considered much above the average, and this fact no doubt in a large measure accounts for the high productiveness of the land and its suitability for wheat growing. It is also very well supplied with organic matter. In lime, the percentage obtained by using hot, strong hydrochloric acid as a solvent, is by no means insignificant, but that a very small proportion exists in an active and assimilable condition is evident from the small proportion soluble in dilute citric acid, viz., ·075 per cent.

It seems, therefore, from our examination that this is to be considered a rich soil, but one that might be improved by thorough drainage, careful working and the judicious use of lime. An application of this 'amendment,' say, at the rate of 40 bushels per acre, harrowed under, would, we believe, increase the soil's productiveness, and in conjunction with drainage, weathering and 'dry' working of the land, materially ameliorate its physical condition.

The continued use of lime makes it desirable to supply the soil from time to time with organic matter. This, of course, may be done by an application of stable manure, but when there is only a limited supply of this available it will be advisable to have recourse to the turning under from time to time of a green crop—preferably one of the legumes, such as clover or pease.

THE RELATION OF 'COVER' CROPS AND CULTIVATION TO SOIL MOISTURE.

For some years past there has been a keen interest evinced by the orchardists and fruit growers of Ontario and eastern Canada in the question of cover crops followed by bare cultivation. The subject is being continually discussed as one of first importance in the horticultural press and at fruit growers' conventions, and there is already on record a considerable amount of practical experience, chiefly of a favourable character, regarding this system of soil treatment. The old method of allowing orchards to remain in permanent sod is being abandoned and in its place this plan is being adopted.

With a view to obtaining data that might prove valuable, more especially towards suggesting a rational treatment of orchard soils in eastern Ontario and adjacent areas in Quebec, we have, with the co-operation of the horticultural division, carried on during the past season certain investigations in the orchards of the Experimental Farm, Ottawa. This work has furnished results of some importance, and will, we think, prove of more than ordinary interest to many of our readers.

We may briefly at the outset state the plan of the system and the principles underlying it.* The land is ploughed in late spring—usually between the latter part of April and the middle of May—and kept thoroughly cultivated until early in July, when one of the legumes, generally mammoth or common red clover, is sown. This, as a rule, is allowed to remain till the following spring, possibly the second or third week in May, when the growth is turned under with the plough and the soil cultivated as many times as is deemed necessary until the beginning of July, when clover is again sown. According to the nature of the soil and the rainfall to be expected in the district, the dates for these operations must be varied somewhat; thus, if drought usually prevails in the early summer months the ploughing under of the clover should not be later than the middle of April—even if there be little or no spring growth—so that by cultivation the spring showers may be conserved. On the other hand, if a generous and well distributed precipitation may be expected the clover may be allowed to remain growing throughout the summer, mowing the crop when necessary. The objects of the system are, primarily, the enrichment of the soil with humus and nitrogen and the conservation of moisture for the use of the trees during the drier months of summer, and incidentally the aëration of the soil and the liberation of its plant food. It also

*For a fuller account, the reader is referred to Bulletin No. 37, Experimental Farms Series, recently written by Mr. W. T. Macoun, Horticulturist, C.E.F.

includes the protection of the tree roots during the winter months. It may also be pointed out that the growth of the clover during the late summer and autumn is expected to utilize soil moisture (that would otherwise serve to keep the trees growing and thus prevent wood duly ripening before winter), and serve to retain the nitrates which might otherwise be lost.

The present investigation was undertaken to obtain data upon one of these features only, viz., relation of cover crop and cultivation to soil moisture. Two areas in the farm orchard were selected and are denoted in the table of results as A and B. The soil on both is light, sandy loam, rather deficient in humus. Particulars as to dates of sowing, ploughing under of the clover, &c., may be briefly stated as follows:—

'A.' In cherry orchard. Clover was sown May 16, 1900, on the plot designated 'Under Crop,' and allowed to remain during the season of 1901.*

The plot 'Cultivated' was planted in 1900 with pease and other vegetables, and in 1901 with vegetables and strawberries. It was constantly cultivated and kept free from weeds throughout both seasons.

For two successive seasons, therefore, the one plot has been in clover, while the other has been kept cultivated.

'B.' In plum orchard. Clover was sown over the whole of this plot on April 28, 1900. On the portion designated 'Cultivated' it was ploughed under April 18, 1901, and the soil cultivated from time to time throughout the season.

The samples of soil, taken every two weeks from May 6 to October 21, 1901, inclusive, were obtained by means of special canisters which secured the soil to a depth of 14 inches. The percentages of moisture and the calculated amounts of water per acre (see table) therefore, represent to that depth the condition of the soil in regard to water-content.

The rainfall statistics have been given, the figures indicating the precipitation during the period between the taking of each set of samples. For practical purposes, an inch of rain means 100 tons of water per acre.

AMOUNT of water, per acre, in soil to a depth of 14 inches (*a*) Under crop and (*b*) Cultivated. Estimations made every two weeks from May 6 to October 21, 1901.

Collection of Sample.	Rainfall.	A.						B.					
		Under Crop.			Cultivated.			Under Crop.			Cultivated.		
		Moisture.	Water per acre (calculated).		Moisture.	Water per acre (calculated).		Moisture.	Water per acre (calculated).		Moisture.	Water per acre (calculated).	
	Inch.	p. c.	Tons.	Lbs.	p. c.	Tons.	Lbs.	p. c.	Tons.	Lbs.	p. c.	Tons.	Lbs.
May 6..	1·33	6·14	130	565	11·55	260	131	9·57	198	520	9·93	206	1,088
" 20..	2·74	12·48	283	1,983	15·03	352	566	15·22	336	472	13·58	294	563
June 3..	2·13	10·99	245	1,798	14·50	337	1,508	14·09	307	347	14·64	321	439
" 17..	1·31	7·29	151	419	13·32	306	88	8·64	177	244	9·30	192	189
July 2..	1·73	4·32	89	1,842	8·84	193	257	8·28	168	1,060	10·76	225	1,646
" 15..	1·26	6·17	130	1,817	9·89	216	374	4·74	93	386	7 99	162	1,291
" 29..	1·37	9·29	203	1,934	14·03	325	39	10·19	212	1,007	15·08	332	1,176
Aug. 12..	4·17	13·63	314	558	13·83	319	1,285	13·58	294	614	15·60	346	329
" 26..	0·29	6·68	142	1,121	8·67	189	14	12·45	266	670	11·08	233	1,876
Sept. 10..	0·52	4·93	103	543	9·73	214	229	4·96	97	1,498	7·96	161	1,963
" 23..	1·68	9·75	214	1,207	11·07	247	1,712	10·57	221	728	12·67	271	1,449
Oct. 7..	1·93	10·54	234	1,288	12·69	289	932	10·67	223	1,417	16·01	357	18
" 21..	0·67	11·76	264	1,715	12·77	290	1,853	13·32	287	1,624	14·99	330	519

*The crop was not ploughed under in spring of 1901, as the soil was considered to possess an abundance of moisture and the enrichment of the soil with humus and nitrogen was chiefly sought.

Plot 'A.' Though during the 24 weeks of the investigation the moisture content is seen to fluctuate considerably, it is invariably greater in the 'cultivated soil.' This is strictly in accord with theory, based on experimental data. The soil in crop loses more moisture by capillarity than that cultivated, and also parts with a considerable amount by transpiration through the leaves of the clover.

The greatest differences, especially during the earlier months, are observable when the precipitation is least. Thus, on May 6, the total rainfall to date was only 1·33 inches, and the excess of moisture in favour of the 'cultivated' land was practically 130 tons per acre. At this time there was a vigorous growth of the clover, and much moisture was consequently being withdrawn from the soil for its development. This teaches an important lesson, as it is from May 1 to the middle of July that we wish particularly the trees to be supplied with all the moisture necessary for their growth. The value of cultivation during this period, if the season is dry, will be proportionally much greater than if there is a fair rainfall. The season of 1901 during its earlier weeks shows a fairly well distributed precipitation, but nevertheless, the data fully confirm this conclusion.

	Rainfall.	Excess of Water, per acre, in cultivated land.	
	Inches.	Tons.	Lbs.
May 6	1·33	129	1,566
" 20	2·74	68	583
June 3	2·13	91	1,710
" 17	1·31	154	669
July 2	1·73	103	1,415

The converse of the proposition considered in the preceding paragraph is also true: The greater the precipitation, the less the difference in moisture content between the soil of the crop-covered and cultivated plots. In illustration of this, we might refer to the differences for May 20, June 3, and August 12, recording the largest rainfalls. The heaviest fortnightly precipitation of the season is for the two weeks preceding the last mentioned date, viz., 4·17 inches, when the difference in favour of the 'cultivated' soil is only 5 tons per acre.

From the 1st July the system seeks to provide the orchard soil with a cover of vegetable growth, which serves (1) to utilize any excess of soil moisture, thus checking the development of the tree and promoting the ripening of its wood, (2) to furnish the roots of the trees with a protection against frost, (3) to enrich the soil in humus and nitrogen, and thus improve it mechanically and chemically, and (4) to assimilate and retain the nitrates formed during the summer months. It is with regard to the first of these only that we shall now present data.

Plot 'A.'—Commencing with July 15, it will be noticed that in the cultivated soil, as heretofore, there was always an excess of water over that present in the soil supporting a growing crop. In other words, there was invariably less soil moisture available for those trees where the clover was growing than for those in the bare and stirred soil. This is more readily seen from the subjoined table:—

	Rainfall.	Decrease in amount of Water, per acre, due to growth of Cover crop and capillary action.	
	Inches.	Tons.	Lbs.
July 15	1·26	85	1,557
" 29	1·37	121	5
August 12	4·17	5	717
" 26	·29	46	893
Sept. 10	·52	110	1,686
" 23	1·68	33	505
Oct. 7	1·93	54	1,644
" 21	·67	26	138

Any extended comment on these results is unnecessary, their character is sufficiently pronounced to tell their own story. The amounts of water which may be con-

sidered as utilized by a growth of clover during the middle and late summer months are very large. In some instances we find that as much as 50 per cent of the soil moisture can in this way be appropriated. Thus, on September 10, after a month in which only ·81 inches of rain fell, the orchard soil carrying a crop of clover contained per acre to a depth of 14 inches 103 tons of water, while the adjacent area that had been kept cultivated possessed to a similar depth 214 tons.

Plot 'B.' This portion of the orchard gave results pointing in the same direction as those of Plot 'A.' On 11 dates out of the 13 on which the collections were made there was an excess of moisture in the cultivated soil.

	Rainfall.	Excess, of Water, per acre, in cultivated soil.	
	Inches.	Tons.	Lbs.
May 6	1·33	8	568
" 20	2·74	....	....
June 3	2·13	14	92
" 17	1·31	24	1,945
July 2	1·73	57	586
" 15	1·26	69	905
" 29	1·37	120	169
August 12	4·17	51	1,715
" 26	·29	....	....
Sept. 10	·52	64	465
" 23	1·68	50	721
Oct. 7	1·93	133	601
" 21	·67	42	895

From May 6 to July 2, the differences are not so large as those for Plot 'A.' This was partly due, no doubt, to the soils not being identical in character and humus-content, but also in a great measure, we believe, to the less luxuriant growth on Plot 'B,' and to the fact that upon it grass had in a large measure supplanted the clover.

Then again, the cultivated portion of Plot 'A' had been cultivated during the previous season (1900), whereas that of Plot 'B' had been in crop. This would tend to give the former the larger amount of moisture. (See article on Conservation of Soil Moisture in report of this Division for 1900.)

We are not at present able to give any satisfactory explanation regarding one or two apparently abnormal results from this plot, as, for instance, on May 20 and August 26, when slightly more moisture was present in the soil under crop than in that under cultivation. These exceptional data are not, however, sufficiently numerous or marked to materially lessen the value of the experiment or cast doubt upon the correctness of the results in general.

This investigation has furnished corroborative evidence of an instructive and accurate character respecting the effectiveness of this system of cover crops and cultivation in the regulation of soil moisture. Much more, perhaps, could have been read into the results, but it was thought wiser to consider only their general trend, leaving until we make further research the discussion of points respecting which there is at present some obscurity.

The past season at Ottawa until the middle of August showed an ample and well distributed, though not excessive, rainfall. There was then a 'dry' month, followed by a fairly normal precipitation till the close of the experiment. It may be possible that the results would be different from those here recorded if obtained in a less favourable season. It will be desirable, therefore, to continue this investigation, extending its scope and making such changes in the plan of working as may be deemed from time to time advisable.

FERTILIZERS

MUCKS AND MUDS.

Owing to press of work in connection with special investigations, most of the samples of the naturally-occurring fertilizers received this year have been judged and

reported upon from a preliminary examination. Since the results so obtained are only partial in their character, they will not be inserted here, but we may include the data of a few samples of which a more complete examination has been made.

Swamp Muck.

Ontario, Algoma, Oxdrift P.O., forwarded by James Latimer :—

Analysis of (air-dried) Muck.

Moisture	8·01
Organic and volatile matter	27·62
Mineral matter, insoluble in acid	49·00
Mineral matter, soluble in acid	15·37
	100·00
Nitrogen, in organic matter	1·236

This muck, though somewhat below average quality, possesses a considerable fertilizing value and would prove useful for all classes of soils deficient in organic matter (humus) and nitrogen. If first composted with barn-yard manure, it should make a fertilizer of some worth for garden stuff, or for top dressing grass.

Prince Edward Island, Charlottetown.—Two samples of muck or peaty soils, forwarded by Mr. Franklyn Bovyer, with a request for information as to their relative value considered as soils, may be here reported upon.

Analyses of (air-dried) Mucks.

	No. 1.	No. 2.
Moisture	5·02	8·39
Organic and volatile matter	46·83	74·65
Mineral matter, clay, sand, &c.	48·15	16·96
	100·00	100·00
Nitrogen, in organic matter	1·43	2·65

As a soil, we should expect No. 1 to be the better, since it contains a more suitable proportion of clay and sand for most crops than No. 2. It would probably more readily furnish available mineral constituents to the growing plants and, certainly, contains a sufficiency of nitrogen.

Considered from the standpoint of their nitrogen and humus, No. 2 is the better. This makes it more valuable for composting purposes.

Both samples are distinctly sour, and would in consequence, for the majority of crops, be improved by lime or wood ashes.

'Mud' from the Flats at Yarmouth, N.S.

Nova Scotia.—In the harbour of Yarmouth there is a vast deposit, concerning the nature of which and its fertilizing value information has been asked by several farmers in the neighbourhood of the town. Thus in writing under date of February 20, 1901, Mr. W. T. Sterritt, of Yarmouth, N.S., says : 'This accompanies a sample of 'flats mud,' of which our harbour is full. We request the favour of an analysis, and if it possesses any merit as a fertilizer, we should be glad to know it, for it can be easily obtained here in practically unlimited quantities. It has not, apparently, been used as a fertilizer, but there are many farmers here who are anxious to learn if it is worth applying.'

It is of a slatey-gray colour, very similar to clay in consistency when wet. On exposure to the air it dries into somewhat hard masses.

Analysis of (air-dried) Mud.

Moisture	2·06
Organic and volatile matter	4·86
Clay and sand (insoluble in acid)	83·44
Oxide of iron and alumina	5·92
Lime	1·02
Magnesia	·70
Potash	·01
Phosphoric acid	·19
Common salt	1·80
	100·00
Nitrogen, in organic matter	·215

The percentages of the essential elements of plant food—nitrogen, phosphoric acid, and potash—are so small that we should not feel justified in advising the use of this deposit as a fertilizer. It is quite possible that it might be applied beneficially to certain soils, but the advantage would be from its mechanical, rather than its manurial, effect.

The amounts of nitrogen and phosphoric acid are very similar to those found in fairly good soils, but the percentage of potash is extremely small. There is a notable, though not large, percentage of lime, which no doubt would give the deposit a value for soils deficient in this element. Owing to the, comparatively speaking, large amount of salt and the fact that the mud dried into hard lumps, we think its trial should be made with care and at first only on a limited scale.

MARL AND LIMESTONE.

There are many soils in Canada capable of improvement by the judicious use of lime. As this fact becomes better recognized we not only receive inquiries respecting the application of this amendment, but also many specimens of marl and limestone for report as to their lime-content. In districts where lime is scarce, or expensive by reason of long freightage, and deposits of marl (carbonate of lime) occur, this latter material may be advantageously employed as a source of lime, either as a direct application to the soil or after burning. Again, it frequently happens that neither lime nor marl is easily procurable, and then information is sought as to the character of the rock in the neighbourhood, with a view to the possible production of lime by burning.

The majority of the samples so received have been reported upon simply from a preliminary examination—this being considered to afford sufficient information for the purpose. A few of them, however, have, for special reasons, received a more or less complete analysis, and the results so obtained are here inserted.

Marl.

British Columbia.—A sample forwarded from Spallumcheen Valley, B.C., by Mr. Donald Graham, of Armstrong, furnished the following data:—

	p. c.
Insoluble rock matter	23·11
Carbonate of lime	52·68
Organic matter, oxide of iron, &c. (undetermined)	24·21
	100·00

This would yield, on burning, practically 30 per cent of lime, and consequently, if occurring in any quantity, would be valuable in those districts in which the soil needs this element of plant food.

It is found underlying muck, but the extent of the deposits in this district is not known to the writer.

Nova Scotia.—From Lower Settlement, South River, sent by Mr. James Dunn.

	p. c.
Insoluble rock matter	18·68
Carbonate of lime	69·46
Organic matter, oxide of iron, &c. (undetermined)	11·86
	100·00

This is a marl of very fair quality and would prove a valuable source of lime for all soils requiring this element. On burning, it would yield about 39 per cent of lime.

Limestone.

Quebec.—From Stornaway, Compton county, sent by Mr. E. M. Campbell, who writes: 'The soils of the farms in this vicinity would be greatly benefited by an application of lime. We shall be glad to learn if lime for such a purpose could be obtained by burning the rock, a sample of which I send you herewith.'

	p. c.
Insoluble rock matter	86.03
Carbonate of lime	3·19
Oxide of iron and alumina	9·78
Undetermined	1·00
	100·00

It is quite evident from these figures that this rock is not limestone, and would be valueless for the purpose of making lime.

From Labelle county, sent by Hon. Wm. Owens, Montebello. There are many stiff clay loams in this locality, which, it is presumed, would be improved, chemically and mechanically, by an application of lime. The analysis of two specimens of 'limestone rock' occurring in the district furnished the following results:—

	Light Specimen. Per cent.	Dark Specimen. Per cent.
Insoluble rock matter	29·70	36·20
Carbonate of lime	60·75	54·55
Oxide of iron and alumina	5·40	5·70
Undetermined	4·15	3·55
	100·00	100·00

There is no great difference in value between the samples. The 'light' limestone would yield, completely burned, 34 per cent lime; the 'dark' limestone, 30 per cent lime. Though the resulting lime would be too poor for building purposes, it might be used to advantage agriculturally.

THOMAS' PHOSPHATE FLOUR (BASIC SLAG).

Under several names, Gilchrist Thomas Slag, Basic Slag, Thomas' Phosphate Flour, &c., a by-product of the Bessemer steel process, finds its way upon the market.

Its fertilizing value may be said to depend upon two factors : the percentage of phosphoric acid present, and the degree of fineness to which the slag has been ground. Although only introduced into Canada some three years ago, it is fast growing in favour, being found a useful source of phosphoric acid, more especially for sour soils, those rich in humus, and those deficient in lime.*

Basic slags, as might be expected, will vary in composition, but usually they contain between 15 per cent and 20 per cent of phosphoric acid, of which we have found about two-thirds is soluble in a 1 per cent solution of citric acid, and hence may be considered as more or less 'immediately available.' There is also present a certain amount of free lime, generally about 15 per cent, and it is this fact that gives the slag an additional value for soils of the character we have mentioned. With respect to the *fineness of grinding* already referred to, it has been ascertained that the solubility of the phosphoric acid, in other words, the activity of the fertilizer, is in proportion to the degree of fineness—the coarser the slag the slower does it set free its phosphoric acid for crop use.

To obtain data upon the degree of availability of its phosphoric acid, certain laboratory experiments were made upon a sample of 'Thomas' Phosphate Flour,' forwarded by a correspondent in Nova Scotia, in which province, as well as in New Brunswick, we learn this fertilizer has a large sale. It was in the form of a fine, almost impalpable powder.

The total phosphoric acid present was found to be 18·23 per cent.

Citric Acid, 1 per cent.—One gram of the fertilizer was shaken up with 100 c.c. of 1 per cent citric acid solution (a solvent presumed to be approximately equal to the exudations of roots in strength or power of rendering soluble mineral plant food) for two hours at ordinary temperatures and filtered. Analysis showed that 10·33 per cent phosphoric acid had entered into solution. In the next experiment 1 gram of the fertilizer was shaken up with 200 c.c. of the 1 per cent citric acid solution, time and temperature being the same as in the preceding trial. Phosphoric acid to the extent of 11·55 per cent had been dissolved.

Further investigation will be made to ascertain, if possible, the limit of solubility or availability, but these data are in themselves sufficient to indicate that a very large proportion of the phosphoric acid *may* be rendered assimilable during the first season of application. Further, it is evident that this fertilizer is not, as thought by some, to be considered in the same category, as regards availability, with 'phosphate rock,' 'floats,' &c., forms of phosphoric acid which can scarcely be used directly owing to their very slow solution in the soil.

In England and Germany, countries now using large quantities of this fertilizer (Basic slag), especially as a top dressing for grass lands, the relative value of a sample is determined by the amount of phosphoric acid soluble in a 2 per cent citric acid solution (Wagner's method). By this stronger solvent we obtained from the sample under consideration 12·77 per cent phosphoric acid.

WOOD-ASHES.

In the course of the examination of many soils from British Columbia, it has been made evident in a number of instances that it would be advisable to apply lime, either to supply a deficiency in this element of food, to serve as a correction for sourness or to aid in the conversion of certain injurious iron compounds found in badly drained lands. To this end we have advised the application of wood-ashes, which would not only furnish lime, but also notable amounts of those important constituents of plant food—potash and phosphoric acid—but to this suggestion we almost invariably receive the reply that such are not obtainable. The common and, indeed, almost universal impression among farmers of that province is that the soft woods, Douglas fir, cedar, &c., do not contain any mineral matter and produce no ash when burnt. There is no

*For a fuller account of this fertilizer, see report of this Division for 1898, p. 160.

doubt but that the percentage of ash in these woods is small, much less than in hard woods, but that there is not any ash is an error. The very 'light' character of the soft wood ashes, rendering them easy of dissipation by the wind, has, we think, materially assisted in this belief. It is our intention, therefore, when an opportunity permits, to ascertain the amount and composition of the ash in the various British Columbia woods grown on soils of various characters, but in the meantime it will be of interest to furnish the data from a sample of Douglas fir ashes forwarded from Kamloops, B.C., recently analysed in our laboratories. The correspondent sending the ashes says: 'The Douglas fir wood ashes I send are just as taken from the ash heap at the power house here. Kindly let me know if they contain any considerable amount of potash, and if they would be valuable as a fertilizer for an orchard soil.'

Our analysis furnished the following data:—

	p. c.
Moisture	·19
Organic and volatile matter	·90
Insoluble residue (clay, sand, &c.)	40·68
Oxide of iron and alumina	13·95
Lime	27·13
Potash	3·12
Phosphoric acid	1·84

Microscopic examination of the 'insoluble residue' revealed the presence of a considerable amount of quartz sand with a certain small proportion of clay. We may fairly presume, therefore, that the sample is not representative of the pure ash of the Douglas fir. Considered as a commercial sample of wood ashes, it may be noted that they are not of equal quality with hardwood ashes purchasable in eastern Canada, which contain, on an average, 5½ per cent of potash. They nevertheless possess a sufficiency of this element to give them a distinct value as a potassic fertilizer. And further, their lime content points to their usefulness for such soils as we have been considering. We would strongly advise farmers, and especially fruit growers, to procure when possible such ashes, feeling assured that it is only from soils comparatively rich in available mineral constituents that vigorous, healthy growth can be obtained.

TANNERY WASTE.

This material consists largely of 'fleshings' or scrapings from the hides after their maceration—the first step in the cleansing process of the hide at the tannery. When this waste is fairly free from hair, leather scraps and other similar substances that resist decay (as is usually the case), we may suppose it to furnish nitrogen that will, more or less readily become converted by nitrification (as for instance, by fermentation in the compost heap, or more slowly in the soil) into forms assimilable by plants. It is consequently to be considered a valuable nitrogenous fertilizer.

A correspondent in Oakville, Ont., forwarded a month ago a sample for examination. It was a reddish mass of the consistency of cheese, showing white spots or particles throughout and possessed of a most offensive smell. On analysis, we obtained the following data:—

Analysis of Tannery Waste.

Water	45·91
Organic matter	53·42
Ash or mineral matter	·67
	100·00
Nitrogen, in organic matter	3·23

Potash and phosphoric acid being practically absent, the fertilizing value of this substance depends on its percentage of nitrogen and the readiness with which this element might be liberated for plant use.

From what has already been said it might be inferred that the relative value or usefulness of nitrogen in various fertilizers differs greatly, according to its availability. Thus, the nitrogen of nitrate of soda is immediately usable by crops, and capable of giving a large increase in yield at once; it is consequently worth more, pound for pound, than the nitrogen in bone meal, which only becomes slowly available by the decay of the bone in the soil. The relative values or availability of the nitrogen in certain of the more important agricultural forms, as ascertained by vegetation tests, has been given, approximately, as follows:—

Nitrate of soda	100
Dried blood	70
Ground fish and flesh meal	65
Bone meal	60
Leather, wool, hair, horn and hoof	5 to 30

Presuming that all the nitrogen present exists as flesh, then we may assign to it a value equal to half of the value of nitrogen in nitrate of soda, but if there is any admixture of hair, leather, &c., then it might not be worth more than one-fourth that amount.

Leather waste and hair.—These, agriculturally speaking, are of very little value, owing to their power of resisting decay. Thus, though they may contain large amounts of nitrogen, this element is 'locked up' so securely as to be for a very long time quite useless to plants. Some authorities state that decomposition may be started and the nitrogen set free by composting the leather waste with actively fermenting dung, with urine or with strong alkalies, such as potash, but considering the refractory character of this material, the writer is of the opinion that nitrogen can be obtained cheaper, as from the clover crop, for instance. However, if it is wished to make a trial, a plan suggested would be to place the waste in alternate layers with good unleached wood ashes in a large vat, keeping the mass thoroughly moistened. At the expiration of several months the waste will be disintegrated and to a certain extent decomposed. A modification of this plan would be to pour a hot solution of lye over the waste and allow to remain for some time. Fertilizer manufacturers adopt the method of roasting the leather waste and heating with sulphuric acid (oil of vitriol) subsequently neutralizing the residue. This process is the most effective towards making the nitrogen assimilable, but unfortunately it is not practicable upon the farm, special apparatus and experience being required.

SEA-WEED.

Large quantities of sea-weed may be collected on both the eastern and western coasts of Canada, and hence farmers are constantly inquiring as to its fertilizing value and the best methods for its use.

In the report of this Division for 1894, we published the analysis of rock-weed (*Fucus furcatus*), obtained in January, at Smith's Cove, N.S. The data showed that it was to be considered as a valuable manure, on account of the potash and nitrogen it contained.

Composition of Rock-weed.

	p. c.
Water	63·49
Organic matter	27·93
Ash and mineral matter	8·58
	100·00

	Per cent.	Pounds per ton.
Nitrogen	·468	9·36
Potash	2·025	40·50
Phosphoric acid	·108	2·18

In September of the present year a sample of another variety of rock-weed (*Fucus vesciculosus*) was forwarded from St. Andrews, N.B. It was quite fresh when received, and was immediately analysed.

	p. c.
Water	79·23
Organic matter	15·23
Ash or mineral matter	5·54
	100·00

	Per cent.	Pounds per ton.
Nitrogen	·172	3·44
Potash	·76	15·20
Phosphoric acid	·04	·80

The fact that the sample analysed in 1894 contained less water (63·49 per cent) than the one examined this year will account, in part, for the present percentage of the fertilizing constituents being lower. It does not, however, entirely explain the differences that are to be noted, and we are unable to say whether such are in part due to inherent qualities of the two varieties or to the time of year (and consequently of growth) at which they were collected. Recent investigations conducted at the Rhode Island Experiment Station laboratories go to show that sea-weed gathered in the winter season are richer in fertilizing elements than those gathered in the summer.

The value of this essentially potash fertilizer is enhanced by the readiness with which this material decomposes in the soil, liberating the same season much of its plant food in assimilable forms. It answers best on warm, moist, porous soils, and may be lightly ploughed or harrowed under to the extent of 20 to 30 tons per acre. If it is inconvenient to apply the sea-weed at once to the soil it may be composted, care being taken that the potash is not lost by leaching rains.

Eel Grass (*Zostera marina*).

This marine plant grows freely and in large quantities in the shallow waters along the north shores of Nova Scotia and New Brunswick, and in the estuaries and bays of Prince Edward Island. It is generally considered to have little or no fertilizing value, and this opinion no doubt results from the fact that it is extremely difficult to rot it, either in the soil or in the compost heap. Nevertheless it contains notable amounts of plant food, as will be apparent from the subjoined analysis. Its chief uses at present are for mulching and as a material for banking up houses, barns, &c., in the autumn to keep out the frost.

In the year 1891, a sample of eel grass that had been dried at a gentle heat was forwarded from Haliburton Bridge, N.S., to the laboratories, and yielded the following data:—

	p. c.
Nitrogen, in organic matter	1·24
Ash or mineral matter	21·90
Phosphoric acid (in ash, 1·80 per cent)	·41
Potash (in ash, 13·28 per cent)	2·90

In December, 1900, we received from Mr. D. J. Stewart, Aitkens Ferry, P.E.I., two samples, of which he writes as follows :—'No. 1 is the fresh green Eel grass, in

long pieces. No. 2 is in short, broken up pieces which come ashore in large quantities in the autumn. We should like to know their relative value as regards plant food. Most farmers in this section consider the short, brown material of little or no value, and it is possible that it has lost some of its potash by being so long in the salt water. If of equal value, weight for weight, it would be more economical to haul the short stuff. Further, the latter mixes better with stable manure than the fresh green Eel grass. After cleaning out the cow stable we place a layer of the short grass in the gutter as an absorbent and we have had good results by having as much as half the bulk of manure of Eel grass. However, it is as a summer mulch for strawberries that I have used the largest quantity of this short material, and find it for this purpose much better than cut straw, which, as you know, gets wet and mildews and is apt to induce decay in the berries. This short sea-weed never mildews and the berries resting upon it remain sound.'

Our analyses of these two samples are as follows:—

	Fresh material, in long pieces.	Short, brown, old material.
Water	74·05	84·81
Ash or mineral matter	7·16	4·81
Ash, insoluble in acid	·91	1·43
Phosphoric acid	·11	·05
Potash	·87	·05
Nitrogen, in organic matter	·42	·17

It is evident from these data that, weight for weight, the fresh Eel grass contains much the larger percentage of plant food. The short, brown material has lost half of its phosphoric acid, about nine-tenths of its potash, and somewhat more than half its nitrogen. As to the relative availability of these constituents in the two samples, it is impossible to speak with certainty, but possibly the short, brown Eel grass may have the advantage in this respect.

There is no doubt that the application of Eel grass directly to the soil would be of little value, owing to its strong resistance to decay, but first air-dried and used as an absorbent material in the stable, or composted, we think its fertilizing constituents could in a large measure be made available.

FODDERS AND FEEDING STUFFS.

ROOTS.

In the report for 1900 we furnished information respecting the comparative feeding value of certain roots, as ascertained by chemical analysis on the crop of that year. To learn how far the character of the season or other possible factors might affect the composition of these roots, as well as to obtain data that could be used in compounding rations for steers under experiment during the coming winter, we have submitted to analysis specimens from the crop of 1901 grown on the Central Experimental Farm.

Time did not permit us to make complete analyses. We, therefore, determined the percentage of dry matter and the percentage of sugar (in juice), these being the two most important data from the feeding standpoint. The amount of true protein in roots is very small, and fat exists practically in traces, so that in the results here given we have all the necessary figures upon which to base a judgment as to the nutritive value of the roots.

ANALYSIS of Roots, Central Experimental Farm, Ottawa, 1901.

Number.	Variety.	Water.	Dry Matter.	Sugar in Juice.	Average Weight of one Root. Lbs.	Oz.
1	Gate Post Mangel	90·59	9·41	4·15	2	9
2	Golden Fleshed Tankard Mangel	90·37	9·63	5·02	2	7
3	Giant Yellow Globe Mangel	90·90	9·10	4·80	3	3
4	Short White Improved Carrot	89·78	10·22	4·63	1	9
5	Intermediate Short White Carrot	90·51	9·49	4 40	2	3
6	Danish Improved Sugar Beet, ordinary culture	81·47	18·53	11·87	2	1
7	" " " (another sample).	83·16	16·84	11·49	3	6
8	" " special culture	80·61	19·39	11·28	1	11
9	" " " (another sample).	81·50	18·50	12·C0	1	7
10	Half Sugar Rosy Mangel (Vilmorin)	....	....	7·38	2	4
11	Half Sugar White Mangel (Vilmorin)	....	....	6·47	2	5
12	Vilmorin's Improved Sugar Beet	....	....	14·08	1	10
13	Danish Red Top Sugar Beet	....	....	10·54	1	12
14	Danish Improved "	....	....	15·47	1	9
15	Red Top Sugar "	....	....	8·89	1	15
16	Royal Giant "	....	....	7·88	1	15
17	Klein Wanzleben "	....	....	14·91	1	6
18	Improved Imperial "	....	....	9·80	2	0

MANGELS.

It will be evident on comparing the present results with those recorded last year that the composition of any particular variety is by no means constant. The factors that control this susceptibility to change are possibly three: the seed, the soil, and the season. The size of the root, however, has also been shown to be a matter of importance—the larger roots being usually found to contain somewhat the less dry matter, and, therefore, compared weight for weight with smaller roots of the same variety, to be of less feeding value. As the roots this year selected for analysis were slightly smaller than those of last season, this cause cannot be advanced to explain the lower percentages of dry matter which is observable in many of the examples.

The results of the three varieties of mangels—Gate Post, Golden Fleshed Tankard, and Giant Yellow Globe—gave an average last year of 9·86 per cent dry matter, and 4·52 per cent of sugar in juice; this season we obtained 9·04 per cent and 4·65 per cent respectively, for these constituents. Taking the average data of a class of roots, therefore, the variations are not large, though there may be considerable differences between the roots of any one variety, from year to year.

SUGAR BEETS.

The 'Danish Improved' was the sugar beet grown both seasons under 'ordinary' and 'special' culture in the field to ascertain the effect of earthing upon the relative feeding value. Our results for the dry matter and sugar are:—

—	1900.		1901.	
	Dry Matter.	Sugar in Juice.	Dry Matter.	Sugar in Juice.
Ordinary culture	20·35	16·43	17·68	12·68
Special culture	21·49	16·98	18·54	12·94

With regard to this variety, we have observed that of all the sugar beets grown during the past two seasons on the Central Farm it showed the least tendency to grow above the surface of the soil, and consequently required least earthing up. Indeed, very little difference could be detected between the roots earthed up and those grown under ordinary field culture, and the analytical data confirm this observation. For this reason we are of the opinion that it would be a desirable variety to grow where the crop is intended for feeding purposes.

Sugar beets Nos. 12 to 18, inclusive, did not receive special culture, being simply grown in test plots to obtain the yields per acre. We notice that the Danish Improved stands highest in sugar content, corroborating the statement just made regarding this variety. The Klein Wanzleben and Vilmorin's Improved stand next in order of merit. No doubt, under special culture for factory purposes, the majority of these varieties would have shown a much higher percentage of sugar, but the present results are of interest in showing their relative merit in sugar production when treated as ordinary field roots.

Mangels with a high sugar percentage.

We would call special attention to the two mangels, Half Sugar Rosy and Half Sugar White (Nos. 10 and 11), from seed produced and kindly furnished by Messrs. Vilmorin, of Paris, France. The sugar content is remarkably high for mangels, clearly indicating their importance for feeding purposes. We have in them an excellent example of the scope and value of special breeding and selection with a definite end in view, the Messrs. Vilmorin having for some years been engaged in developing a mangel with a high sugar percentage.

Sugar content in lower and upper parts of roots.

To furnish experimental proof of the statement regarding mangels that has several times been made respecting sugar beets, viz., that the part of the root beneath the soil contains more sugar, and hence has a higher feeding value than the portion above ground, we made an analysis of six roots each of Gate Post and Giant Yellow Globe mangels, estimating the sugar in the upper and lower parts of the roots. The following statement gives our results:—

Variety of Mangel.	Percentage of Sugar.
Giant Yellow Globe Mangel—part below ground	5·08
" " part above ground	4·54
Gate Post Mangel—part below ground	4·75
" part above ground	4·12

A consideration of the fact that sugar is the chief constituent of value in roots might lead us to infer, in the light of this experiment, that a system of culture which tends to keep the roots fairly well earthed up is one that will result in the most nutritious crop. Further, those varieties which naturally tend to grow beneath the soil, providing they furnish an adequate yield per acre, will be the most profitable to grow.

ON THE CHANGES IN THE COMPOSITION OF ROOTS DURING STORAGE.

There is an impression among many stock feeders of experience that the feeding qualities of ordinary farm roots improve with storage. This opinion, however, is not generally held, and it was, therefore, to obtain further information regarding possible changes in the composition of roots during storage in a root cellar, that analyses were made from time to time (from October, 1900, to March, 1901) of several varieties from the crop of 1900. The roots examined included three varieties of mangels, two of carrots, and one each of turnips and sugar beets. About two bushels of each variety were selected—roots of typical size and shape only being taken—and placed in bags which were throughout the investigation kept buried in a large heap of roots in the cellar. By this means the conditions of storage obtained were similar in all respects to those ordinarily prevailing in good root cellars. On March 15, the last date of analysis, the roots remaining were all sound and in good condition. The sample for analysis in each instance consisted of six roots.

Before discussing the results of the present investigation, however, it may be profitable to consider certain facts regarding this problem that have been recently brought to light by the researches of other investigators. In 1898, Wood showed the nitrates present in the juice of the mangels, as pulled, decreased in amount to the extent, approximately, of one-half by January 15. ' These nitrates, he states, ' are liable to cause derangement in digestion; by January these nitrates have been changed into amides which have some feeding value and are quite harmless.'* The probability is that under systems of manuring as practised in Canada, nitrate of soda or sulphate of ammonia not being extensively used, the proportion of nitrogen in the freshly pulled root present in the form of nitrates is not so large as that in roots from highly fertilized fields, as in England. Nevertheless, this discovery is an important one as showing the trend of change in certain of the nitrogenous compounds of roots.

In an exceedingly able and exhaustive paper on this subject, Dr. A. H. J. Miller,† after quoting results obtained by the late Dr. Voelcker, to the effect that stored roots undergo considerable change, chiefly by loss of sugar and allied bodies, and possibly also of nitrogenous compounds, due to a process of slow combustion, gives in detail the data of an interesting series of experiments conducted by himself on mangels grown with and without nitrate of soda at Rothamsted. After tabulating the results from mangels receiving no nitrate, Dr. Miller concludes: ' No essential change (except in total weight, evidently due to loss of water) took place up to the end of March. During the next three months (*i.e.,* till the end of June), however, there was a considerable loss of dry matter, much of which was due to destruction of sugar, whilst about half the cane sugar was inverted.' By June 20, about 14 per cent of the total sugar originally present had disappeared, but the loss in non-nitrogenous matter other than sugar exceeded this amount. The examination of mangels that in addition to other manure had received 550 pounds of nitrate of soda per acre showed ' a regular decrease both of dry matter and of sugar. Even by the end of March the loss of sugar was considerable, and a good deal inverted.' After discussing the probable loss in sugar per acre of roots by storage until the end of June, he says: ' Taking into account the variety of conditions which presumably affect the changes undergone by stored roots, any conclusions drawn from the results can only be given with some reserve. It seems, however, very probable that a considerable loss of the most important constituent, sugar, and of other constituents, does frequently take place. That nitrate of soda increased the loss of sugar, if not of other constituents, seems to be highly probable, since the two lots of roots were kept together

*Changes in Mangels during storage, T. B. Wood, Journal R.A.S.E., 3rd series, Vol. IX., part III.

†Experiments at Rothamsted on the changes in the composition of mangels during storage, A. H. Miller, Journal R.A.S.E., 3rd series, Vol. XI., part I.

under exactly the same conditions.' He further adds: 'Increased digestibility after a lengthened period is conceivable, and might be due to a partial breaking down of the crude fibre,' but 'in view of, however, the small amount of crude fibre in roots, a change of this kind would seem to be of doubtful value, and any gain in digestibility, if it takes place, may be a good deal more than counterbalanced by the losses to which we have called attention.'

The practical suggestions for the Canadian farmer that seemed to be called forth by this important work are that the temperature of the root cellar should be kept as cold as possible—but not reaching the freezing point—and that the cellar should have good ventilation. Under such conditions the process of slow combustion that causes the loss of sugar will be retarded.

Our own investigation had for its chief object the tracing of the albuminoids during storage, it being thought that as spring approached these would be converted into amides or other nitrogenous compounds of less feeding value.

Dry Matter in Roots during Storage.—In table I. the percentages of water and dry matter for the several roots are given as determined when the roots were freshly pulled (October), in January and in March of the following year. The most obvious and remarkable feature of these data is their uniformity for each variety of root, showing, as they do, that throughout the period of storage the ratio of dry matter to water-content remained practically the same. Such differences as do occur are not greater than would have been obtained from the examination of individual roots. There had evidently been no 'drying out' of the roots.

While it is impossible to state absolutely from these results that until March 15 there had been no loss in total weight, we may fairly infer that such loss, if any, can not have been large. It is satisfactory, therefore, to note that the conditions of storage were in such a large measure conducive to the preservation of the roots. If we were to estimate feeding value simply by percentage of dry matter, then, weight for weight, the roots in March are as nutritious as they were in the October previous.

Nitrogen in Dry Matter.—Determinations of the total, albuminoid and non-albuminoid nitrogen were made on the roots in October, January and March, and the results calculated upon the dry matter. These are presented in table II.

Total Nitrogen.—In five of the seven instances cited, the nitrogen is slightly higher in March than in October. This is evidently due to the destruction by slow combustion of a small amount of the non-nitrogenous organic matter, which would necessarily leave the dry matter rather richer in nitrogen. This, as we shall see later on from our results, does not mean necessarily that the dry matter is more nutritious in the roots stored until March. With two of the varieties there had been a small loss in total nitrogen. This may have resulted from differences in the individual roots examined, or to a direct loss of nitrogen by fermentative changes.

TABLE I.—Composition of Roots During Storage—1900-1901.

Date of Examination.	Gate Post Mangel.		Giant Yellow Globe Mangel.		Golden Tankard Mangel.		Improved Short White Carrot.		Guérande or Ox-Heart Carrot.		Champion Purple Top Turnip.		Danish Improved Sugar Beet.	
	Water.	Dry Matter.	Water.	Dry Matter.	Water	Dry Matter.	Water.	Dry Matter.	Water.	Dry Matter.	Water.	Dry Matter.	Water.	Dry Matter.
October 27	88·86	11·14	91·82	8·18	89·75	10·25	91·51	8·46	88·36	11·64	89·23	10·77	78·51	21·49
January 15	88 87	11·13	92·34	7·66	91·15	8·85	89·49	10·51	89·55	10·45	89·85	10·15	79·58	20·42
March 15	89·92	10·08	90·54	9·46	90·94	9·06	90·27	9·73	89·35	10·65	88·91	11·09	78·98	21·02

TABLE II.—Nitrogen in Dry Matter in Roots, 1900-1901.

Date of Examination.	Gate Post Mangel.			Giant Yellow Globe Mangel.			Golden Tankard Mangel.			Improved Short White Carrot.			Guérande or Ox-Heart Carrot.			Champion Purple Top Turnip.			Danish Improved Sugar Beet.		
	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.	Total Nitrogen.	Albuminoid Nitrogen.	Non-Albuminoid Nitrogen.
October 27	1·17	·75	·42	2·43	1·19	1·24	1·28	·84	·44	1·58	1·02	·56	1·53	·91	·62	1·26	·91	·35	1·03	·52	·51
January 15	1·03	·59	·44	2·16	·85	1·31	1·55	·79	·76	1·43	·74	·69	1·62	·75	·87	1·63	·86	77	1·01	·44	·57
March 15	1·39	·75	·64	1·72	·64	1·08	1·95	·82	1·13	1·54	·79	·75	1·76	·84	·92	1·76	·96	·80	1·14	·54	·60

The Albuminoid and Non-albuminoid Nitrogen.—The percentage of albuminoid nitrogen (which, as we have said, has the greater feeding value) appears to remain fairly constant in the dry matter throughout the period of storage, though in the case of two of the roots, Giant Yellow Globe mangel, and Improved Short White carrot, there had been a notable decrease, due probably, in part at least, to the breaking down of the albuminoids. Since, as we have seen, the percentage of total nitrogen (calculated on the dry matter) in the majority of the examples increased somewhat during storage, it necessarily follows that the percentage of non-albuminoid nitrogen has slightly increased. This is the case in each class of roots, as will be observed by reference to table II. It is perhaps the most noticeable fact brought out by this investigation.

TABLE III.—Ratio of Albuminoid to Non-albuminoid Nitrogen in Roots.

Date of Examination.	Gate Post Mangel.	Giant Yellow Globe Mangel.	Golden Tankard Mangel.	Improved Short White Carrot.	Guérande or Ox Heart Carrot.	Champion Purple Top Turnip.	Danish Improved Sugar Beet.
October 27	1:0·56	1:1·04	1:0·52	1:0·55	1:0·68	1:0·38	1:0·98
January 15....	1:0·74	1:1·54	1:0·96	1:0·93	1:1·16	1:0·89	1:1·27
March 15....	1:0·85	1:1·68	1:1·38	1:0·95	1:1·09	1:0·83	1:1·11

The non-albuminoid nitrogen includes that present in amides and other compounds of inferior feeding value. We may, therefore, assume that provided the percentage of total nitrogen in the dry matter does not decrease, then the feeding properties of that dry matter, as far as nitrogenous compounds are concerned, will depend upon the relative proportion of the albuminoid to the non-albuminoid nitrogen. In table III. we have given this ratio (calculated from the data of table II.), which, it will be observed, in all the roots save the sugar beets increases markedly during the storage period.

From the foregoing statements and data we may infer (1) that nitrates, resulting more particularly from high manuring with soluble nitrogenous fertilizers, and which are more or less injurious to the animal, tend to disappear on storage of the roots; (2) that there is a tendency to fermentative changes during storage that lead chiefly to the destruction of the sugar—the most important nutrient of roots. This deterioration may no doubt in a large measure be controlled by low temperature and good ventilation ; under such conditions, we imagine the loss does not assume in our winter climate any grave proportions. It would no doubt be found to increase markedly after March. Further, (3), that the non-albuminoid nitrogenous componds increase, as a rule, with storage and especially so during the spring months.

It is possible, as pointed out by Miller, that the digestibility of the roots may slightly increase with storage—but this at best can only be a small gain—and, therefore, apart from the question of nitrates, there is no considerable improvement in the quality of roots by storage, as thought by some, but rather a tendency to loss, as evidenced by destruction of the sugar and the formation of non-albuminoid compounds.

Sugar Beets.

The sugar beets examined and here reported upon comprise samples from Strathcona, N.W.T., Winnipeg, Man., and Prince Edward Island.

North-west Territories.—Strathcona, Alta.

These samples were forwarded by Mr. Nelson D. Mills, Strathcona, who in sending the particulars of growth (October 1) writes: 'These beets were sown very late, and came through two hailstorms of unusual severity. In addition to this there have been severe white frosts during the last two weeks, so that if they show a proper percentage of sugar, then no weather that Alberta has in store can interfere with beet raising. I may add that none of the beets had special attention as to tillage, such as deep ploughing and cultivating to kill weeds, &c.'

The particulars of growth as furnished by Mr. Mills are given in table I.; the analytical data in table II.

Table I.—Sugar Beets—Strathcona, N.W.T., 1901.

Number.	Name.	Address.	Variety of Beets.	Dates.		Distance between		
				Sowing.	Pulling.	Rows.	Plants in Rows.	
						Inch.	Inch.	
1	William Place.	S.W. ¼ Sec. 11, Tp. 52 R. 24, 4 miles from Strathcona........	Klein Wanzleben	June 15.	Sept. 30.	24	8	Black loam, clay subsoil.
2	Thos. Rooney.	2 miles south of Strathcona.......	" "	May 22.	Oct. 1..	24	6	Black loam, unmanured.
3	James Pithie..	Salisbury, Alta.....	" "	May 29.	Oct. 2..	30	10	Sandy loam, unmanured.

Table II.—Analysis of Sugar Beets from Strathcona, N.W.T., 1901.

Number.	Variety.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root.	
					Lbs.	Oz.
1	Klein Wanzleben..................	15·01	17·95	84·73	1	1
2	" "	12·84	16·20	79·26	1	2
3	" "	14·02	17·20	81·51		13

Both as regards sugar-content and degree of purity, our data are indicative of excellent quality, and these beets would be considered as quite satisfactory for sugar extraction. In our report for 1900 we gave the analytical data from two samples of sugar beets grown in the Lethbridge district. These also indicated that beets with good sugar-content could be grown in Alberta, and it would, therefore, seem advisable, if sugar manufacture is seriously contemplated, to make a more complete test, growing the beets from the best seed, on larger areas and with strict attention to proper culture. The number of samples hitherto examined is too small for safe deductions as to the general suitability of Alberta for beet sugar production, but certainly the results so far obtained are of a promising character.

TABLE III.—Sugar Beets, Manitoba, 1901.

No. on bag.	Name of Grower.	Address.	Variety of Beet.	Dates.			Distance Between.		Remarks.
				Sowing.	Thinning.	Pulling.	Rows.	Plants in Rows.	
							Inches.	Inches.	
1	D. McKee	Winnipeg	Vilmorin's Impd	June 1	July 4	Oct. 7			Heavy black soil with alkali.
2	"	"	Klein Wanzleben, Impd	June 1	July 4	Oct. 7			" "
3	D. de Graaf	Louise Bridge	Klein Wanzleben	June 8	July 9	Oct. 8	16	8	Heavy black soil.
4	"	"	Vilmorin's Impd	June 8	July 9	Oct. 8	16	8	
5	John P. Haarsma	"	Vilmorin's Impd	June 10	July 8	Oct. 10			Black soil with a little sand, on
6	"	"	Klein Wanzleben, Impd	June 10	July 8	Oct. 10			river bank.
7	R. de Vries	"	Klein Wanzleben, Impd	June 1	July 2	Oct. 9	16	8	Heavy black soil.
8	"	"	Vilmorin's Impd	June 1	July 2	Oct. 9	16	8	
9	Hugh McKay	Fernton	Klein Wanzleben, Impd	June 13	July 4	Oct. 8	16	8	Black soil with a little sand, on
10	"	"	New Danish, Impd	June 13	July 4	Oct. 8	16	8	river bank.
11	A. Hutchings	Winnipeg	New Danish, Impd	June 16	July 2	Oct. 10	16	8	Light sandy soil, on river bank.
12	"	"	Klein Wanzleben, Impd	June 17	July 2	Oct. 10	16	8	" " "
13	J. C. Sproule	Kildonan	Klein Wanzleben, Impd	June 1	July 3	Oct. 1	24	12	Black soil, on river bank.
14	"	"	Vilmorin's Impd	June 1	July 3	Oct. 1	24	12	" "
15	J. B. Gowanlock	Neepawa		May 21		Sept. 26			Heavy sandy loam.

Manitoba.—At the request of the Department of Agriculture for the province, a further examination of sugar beets grown in the Red River valley in the vicinity of Winnipeg, has been made. The beets were received in excellent condition. Mr. Hugh McKellar, Chief Clerk, Department of Agriculture, Winnipeg, in furnishing the cultural data says: 'In a general way, the season was not considered favourable, there being too much rain.' In the foregoing tabular statement are given the varieties of seed used, the names of the growers, and other information respecting the beets, as furnished by Mr. McKellar.

The data for sugar-content and purity indicate, we regret to say, in by far the larger number of instances, beets too poor for profitable manufacture.

The appearance of the beets in several of the samples showed that the roots had not been kept earthed up. This fact, no doubt, accounts in part for the low results, and a further cause may be found in the unfavourable weather of the past year.

TABLE IV.—Analysis of Sugar Beets from Manitoba, 1901.

No.	Variety.	Percentage of Sugar in Juice	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root. Lbs.	Oz.
1	Vilmorin's Improved........	10·03	15·27	65·68	1	12
2	Klein Wanzleben.........	9·52	14·64	65·02	1	8
3	"	10·70	15·01	71·28	1	9
4	Vilmorin's Improved	9·67	14·24	67·90	2	1
5	"	11·29	15·51	72·79	1	13
6	Klein Wanzleben Improved.....	10·88	15·91	68·38	1	12
7	" "	9·83	15·34	64·08	1	10
8	Vilmorin's Improved.....	7·85	12·50	62·80	1	15
9	Klein Wanzleben Improved................	13·08	16·59	78·84	1	5
10	New Danish Improved..........	11·15	14·88	74·93	1	6
11	" "	10·29	14·46	76·00	1	3
12	Klein Wanzleben Improved.................	8·65	12·26	70·55	1	2
13	" "	9·76	14·56	67·03	2	0
14	Vilmorin's Improved	7·53	11·16	67·47	1	10
15	... .	2·36	6·19	38·12	2	3

Though the results, both this year and last, are far from encouraging and certainly give but little promise of successful beet culture in the Red River valley, it is possible that the exceptional character of the season and neglect of special culture may in a large measure be answerable for the low averages obtained.

Sample 15, in our opinion, is not a sugar beet. In appearance it resembles the Golden Tankard, or possibly the Giant Yellow Globe mangel, and its sugar content conforms closely to that of these roots.

Prince Edward Island.—In the report of this Division for 1900 will be found the analyses of six samples of sugar beets grown in this province. This year we present data of seven samples forwarded by Mr. Callaghan, of Charlottetown, respecting which we are informed the seed was sown between May 15 and June 1, and the roots pulled between October 15 and 20.

TABLE V.—ANALYSIS of Sugar Beets from Prince Edward Island, 1901

No.	Variety.	Locality.	Percentage of Sugar in Juice.	Percentage of Solids in Juice.	Co-efficient of Purity.	Average Weight of one Root. Lbs.	Oz.
1	Not stated	....	9·03	13·63	66·25	5	6
2	"	Ellerslie, Prince Co.......	13·98	18·69	74·79	2	..
3	"	West River, Queen's Co...	12·54	17·09	73·37	3	13
4	"	Alberton, Prince Co	10·87	15·59	69·72	2	7
5	"	Charlottetown Royalty....	11·51	16·29	70·65	2	8
6	"	Freeland, Prince Co	11·62	16·49	70·47	2	5
7	"	Kensington, Prince Co....	11·96	17·13	69·81	2	8

These results are not so favourable as those of 1900, due very largely, we think, to improper or rather neglectful culture. The roots had not for the most part been 'earthed' and, as will be seen from the last column of the table, exceed the average weight necessary for a profitable sugar-content.

THE YIELD OF CLOVER AND ALFALFA FROM TWO AND FOUR CUTTINGS RESPECTIVELY.

The question of the relative value of the yield obtained from two cuttings as against that from four cuttings during the season has arisen in connection with the growth of clover and alfalfa. It was in order to gain some knowledge regarding this matter which might prove useful to those employing these plants, both as 'cover' crops and for 'soiling,' that the following investigation was made during the past season.

CLOVER.

A plot, one-twentieth acre, of common red clover in its second year of growth was selected. The clover had been sown in 1900 with grain. The plot was divided diagonally in order to insure greater uniformity, the north side being reserved for the four cuttings and the south side for the two cuttings. The intention was to cut the north side when about to flower, but showing no bloom, and the south side when it was considered in the right condition for cutting for hay.

North Side—Four Cuttings.—The first cutting was made on June 4, 1901, the average height of the clover being 25 inches and the plants about to flower—only two blooms being observed in the whole plot. After the plot had been carefully cut the crop was collected, weighed, and taken to the laboratory for analysis. The weights of fresh material, of the dry matter and crude protein, calculated per acre, are stated in table I.

The second cutting was taken on July 15, which was probably four or five days later than the time intended, as the crop was then found to be in full bloom. The average height was 22 inches.

The third cutting, August 15, showed that in the past month the clover had made an average growth of 8 inches. Many of the plants were in bloom.

The fourth cutting, September 18, indicated a sparse growth—in weight approximately one-half of the third cutting, though the average height of the plants was greater, viz., 13 inches. About one-tenth of the plants were in bloom.

South Side—Two Cuttings.—This half of the plot was in full bloom at the time of the first cutting, June 20, the average height of the plants being 30 inches.

The second cutting was made just one month later, July 20, the clover being again in full bloom, but with some heads withered. The condition of the crop was considered excellent for hay making.

Comparative Yields from Two and Four Cuttings.

The yields from the north side and south side and their food value may now be compared:—

Clover.	Weight of Crop per acre.	Weight of Dry Matter per acre.	Weight of Crude Protein per acre.
	Lbs.	Lbs.	Lbs.
North side (four cuttings)	8,965	1,703	333
South side (two cuttings)	6,900	1,445	234

From these data, it will be observed, there was obtained for the extra labour expended in two additional cuttings 258 pounds more dry matter per acre, which contained 104 pounds more crude protein than in the yield from two cuttings. We are of the opinion from a consideration of the whole experiment that the difference in yield between the two methods (though most probably always in favour of the more frequent cutting) will depend to a large degree on the stage of growth when the cuttings are made, and the time and amount of rain-fall throughout the season. With regard to the former, it is no doubt true that if the plant once forms its seed there will not be the subsequent effort to vegetative growth that there would be if the cutting were made previous to that period; and respecting the latter point, we know that clover being a moisture-loving plant a period of drought after cutting will greatly retard its future growth.

The results of this investigation can scarcely be interpreted as justifying the practice of four cuttings when the crop is to be made into hay, for we think that the extra weight and value obtained would be more than offset by the additional labour involved and the increased difficulty encountered in the drying and curing of the clover, which would contain practically about 5 per cent more moisture than if allowed to come to the period at which it is usually cut for hay. On the other hand, when the crop is intended to enrich the soil or for 'soiling' purposes the data may be taken to indicate that the more frequent cutting of the clover will prove the more advantageous, as yielding the greater amount of material that can be used either as a fertilizer or for feeding in the fresh condition.

Weights and Composition of Dry Matter in Crops of Various Cuttings.

South Side, Two Cuttings.—Compared, weight for weight, the crop of the second cutting (July 20) of the south side is worth more than that of the first cutting (June 20), from the fact that it is richer in dry matter and albuminoids. Thus we have the following data for one ton of each cutting :—

CLOVER (Two Cuttings), Dry Matter and Albuminoids per ton in fresh Material.

South Side.	Dry Matter, Per Ton.	Albuminoids, Per Ton.
	Lbs.	Lbs.
First cutting, June 20, in full bloom..........	405	52
Second cutting, July 20, in full bloom ; some heads withered.......	470	73

The dry matter as regards the relative proportion of albuminoid and non-albuminoid compounds is somewhat more valuable at the time of the second cutting, as is evident from the subjoined data:—

CLOVER (Two Cuttings), percentages of Albuminoids and Non-albuminoids in Dry Matter.

South Side.	Albuminoids.	Non-Albuminoids.
First cutting, June 20, in full bloom..........	12·9	2·7
Second cutting, July 20, in full bloom ; some heads withered.......	15·7	2·5

North Side, Four Cuttings.—Pursuing the same examination as for the south side, and first, comparing the weights of dry matter and albuminoids per ton in the crops of the four cuttings, we obtain the following interesting figures :—

CLOVER (Four Cuttings), Dry Matter and Albuminoids per ton in fresh Material.

North Side.	Dry Matter, Per Ton.	Albuminoids, Per Ton.
	Lbs.	Lbs.
First cutting, June 4, about to flower..........	346	50
Second cutting, July 15, in full bloom..........	464	67
Third cutting, August 15, about one-third in bloom..........	383	66
Fourth cutting, September 18, about one-tenth in bloom..........	498	83

As with the crop from the south side, the trend of the results shows an improvement in quality of the fresh material, both in dry matter and true albuminoids as the season advances. One ton of the fresh material from the fourth cutting has the feeding equivalent of $1\frac{1}{2}$ to $1\frac{3}{4}$ tons of that from the first cutting.

The distribution of the nitrogenous compounds in the various cuttings is made evident by the following tabular statement:—

CLOVER (Four cuttings), percentages of Albuminoids and Non-albuminoids in Dry Matter.

Clover.	Albuminoids.	Non-Albuminoids.
First cutting, June 4, about to flower..........	14·7	5·8
Second cutting, July 15, in full bloom..........	14·4	5·5
Third cutting, August 15, about one-third in bloom..........	17·3	3·6
Fourth cutting, September 18, about one-tenth in bloom..........	16·7	2·4

The increase in the albuminoids and the decrease in the non-albuminoids clearly indicate the greater feeding value of the dry matter in the crop of the two last cuttings. The similarity in composition, in respect to these compounds, of the dry matter of the first and second cuttings is marked, and the same feature is noticeable in the case of the third and fourth cuttings.

After a consideration of the amount of dry matter, that of the true albuminoids is of first importance from the feeding standpoint. We, therefore, have constructed the following tabular scheme to show the amounts of these flesh-forming constituents per acre as obtained from the data of the two plans of cutting, given in tables I. and II.:—

CLOVER—ALBUMINOIDS—Pounds per Acre.

———	South Side (two cuttings).	North Side (four cuttings).
First cutting	143	156
Second "	53	64
Third "	....	20
Fourth "	....	13
Total	196	253

These corroborate the inference already made, that the greater amount of food constituents was produced by the clover that had been cut four times in the season.

TABLE I.—Clover and Alfalfa Experiment, 1901.
Weight of Crop, Dry Matter and Protein, per Acre.

Date of Cutting.	Common Red Clover.						Alfalfa.					
	South Side (two cuttings).			North Side (four cuttings).			South Side (two cuttings).			North Side (four cuttings).		
	Weight of Crop.	Dry Matter.	Crude Protein.	Weight of Crop.	Dry Matter.	Crude Protein.	Weight of Crop.	Dry Matter.	Crude Protein.	Weight of Crop.	Dry Matter.	Crude Protein.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
June 4	....	....	......	6,125	1,062	217	....	....	......	3,230	653	131
" 20	5,460	1,107	173	.....	....	.....	......	......	......	......	.....	......
" 21	......	......	......	....	..	.....	6,400	1,574	257	....	.....	....
July 15	......	.....	......	1,920	446	82	.....	.....	......	2,240	610	92
" 20	1,440	338	61	....	.....	......	.....	.....	......	....	.....	......
Aug. 1	......	......	......	.....	.....	.....	2,080	611	96	....	......	......
" 15	......	....	......	600	115	24	......	......	......	......	......	..
" 19	......	....	......	....	.....	....	......	.....	......	2,780	582	117
Sept. 18	.....	.....	.....	320	80	15	.....	.....	......	1,440	292	74
Total	6,900	1,445	234	8,965	1,703	338	8,480	2,185	353	9,690	2,137	414

TABLE II.—Clover and Alfalfa Experiment, 1901—Composition of Fresh Material.

Date of Cutting.	Common Red Clover.								Alfalfa.							
	South Side. (Two Cuttings.)				North Side. (Four Cuttings.)				South Side. (Two Cuttings.)				North Side. (Four Cuttings.)			
	Moisture.	Dry Matter.	Albuminoid Nitrogen.	Non-albuminoid Nitrogen.	Moisture.	Dry Matter.	Albuminoid Nitrogen.	Non-albuminoid Nitrogen.	Moisture.	Dry Matter.	Albuminoid Nitrogen.	Non-albuminoid Nitrogen.	Moisture.	Dry Matter.	Albuminoid Nitrogen.	Non-albuminoid Nitrogen.
June 4	....	....	....	....	82·67	17·33	·407	·160	....	....	....	....	79·80	20·20	·366	·280
" 20	79·73	20·27	·418	·089	....	....	....	....	....	....	....	....	....	....	....	....
" 21	....	....	....	....	....	....	....	....	75·40	24·60	·391	·251	....	....	....	....
July 15	....	....	....	....	76·79	23·21	·536	·204	....	....	....	....	72·79	27·21	·531	·127
" 20	76·51	23·49	·590	·096	....	....	....	....	....	....	....	....	....	....	....	....
Aug. 1	....	....	....	....	....	....	....	....	70·61	29·39	·505	·233	....	....	....	....
" 15	....	....	....	....	80·83	19·17	·533	·109	....	....	....	....	....	....	....	....
" 19	....	....	....	....	....	....	....	....	....	....	....	....	79·05	20·95	·478	·199
Sept. 18	....	....	....	....	75·08	24·92	·668	·095	....	....	....	....	79·72	20·28	·558	·261

ALFALFA.

The plot for this experiment was of the same size as that for the trial with clover, one-twentieth acre. Similarly, the north half was reserved for four cuttings, and the south side for two cuttings.

North Side—Four Cuttings.—The first cutting took place on June 4. The plants had an average height of 30 inches, and from appearance, were about one week from blooming.

Second cutting, July 15. Average height of plants 28 inches. About half the plants were in bloom.

Third cutting was made on August 19, when the average height of the alfalfa was 20 inches. No bloom showing.

The date of the fourth cutting was September 18. The average height of the crop was 20 inches, and none of the plants were in bloom.

South Side—Two Cuttings.—First cutting was taken June 21. Average height of plants 39 inches.

Second cutting, taken August 1. Average height 20 inches. About one-tenth of the plants in bloom.

COMPARATIVE Yields from Two and Four Cuttings.

The difference to be observed between the yields of fresh material per acre of the north and south sides, though still in favour of the former, is not so great as in the case of the clover. Further, though we notice a corresponding increase in the crude protein of the north half, more 'dry matter' by 50 pounds was obtained from the south half (two cuttings) of the plot.

Alfalfa.	Weight of Crop per acre.	Weight of Dry Matter per acre.	Weight of Crude Protein per acre.
	Lbs.	Lbs.	Lbs.
North side (four cuttings)	9,690	2,137	414
South side (two cuttings)	8,480	2,185	353

By a reference to table II. the explanation of the larger amount of dry matter from the two cuttings (south side) will be apparent. In the first, third, and fourth cuttings (north side) the alfalfa is seen to possess 79 per cent of water, whereas the crop from the south side (cut twice) never contained more than 75 per cent water. The averages of moisture-content and dry matter are as follows :—

	Moisture.	Dry Matter.
North side (four cuttings)	77·88	22·12
South side (two cuttings)	73·00	27·00

The more advanced stage of growth in the alfalfa of the south side plot when cut, fully accounts for the smaller percentage of water.

WEIGHT and Composition of Dry Matter in Crops of Various Cuttings.

South Side—Two Cuttings.—Compared, weight for weight, the crops of the first and second cuttings, as regards dry matter and albuminoids, give data as follows:—

ALFALFA.—(Two Cuttings)—Dry Matter and Albuminoids per ton in fresh Material.

South side.	Dry Matter, per Ton.	Albuminoids, per Ton.
	Lbs.	Lbs.
First cutting (June 21)	492	49
Second cutting (Aug. 1)	588	63

As with the clover from the analogous plot, we have the greater feeding value per ton in the material from the second cutting.

The relative proportion of albuminoids to non-albuminoids in the dry matter of these cuttings is, similarly, seen to be in accord with the results obtained from clover.

ALFALFA.—(Two Cuttings)—Percentages of Albuminoids and Non-albuminoids in Dry Matter.

South side.	Albuminoids.	Non-albuminoids.
First cutting (June 21)	10·0	6·0
Second cutting (Aug. 1)	10·7	5·0

The dry matter of the second cutting is slightly more valuable than that of the first cutting.

North Side—Four Cuttings.—A comparison of the weight of dry matter and albuminoids per ton of fresh material is set forth in the next table.

ALFALFA.—(Four Cuttings)—Dry Matter and Albuminoids per ton in fresh Material.

North side.	Dry Matter, per Ton.	Albuminoids, per Ton
	Lbs.	Lbs.
First cutting (June 4)	404	46
Second cutting (July 15)	544	66
Third cutting (Aug. 19)	419	60
Fourth cutting (Sept. 18)	405	70

The fact that the percentages of dry matter and albuminoids present are influenced by certain factors, principally the number of cuttings, the stage of growth, and season, is well brought out by the above figures. On the whole, the results are in accord with those from the corresponding clover plot, showing that one ton of the fourth cutting is equal as regards albuminoids to 1½ tons, approximately, of the first cutting.

The composition of the dry matter as regards albuminoids and non-albuminoids has been ascertained.

ALFALFA.—(Four Cuttings)—Percentages of Albuminoids and Non-albuminoids in Dry Matter.

North Side.	Albuminoids.	Non-albuminoids.
	Per cent.	Per cent.
First cutting (June 4)	11·3	8·6
Second cutting (July 15)	12·2	3·0
Third cutting (Aug. 19)	14·2	5·9
Fourth cutting (Sept. 18)	17·1	8·0

The Alfalfa differs from the clover in that the non-albuminoids do not decline in the third and fourth cuttings. The percentage of the albuminoids, however, markedly increases in the latter cuttings, as was noticed in the case of the clover. We have seen that, weight for weight, the crops of the first, third and fourth cuttings contain practically the same amount of dry matter, but since, as we have observed, this dry matter of the August and September cuttings is richer in albuminoids, it follows that the crops of these later dates have the greater feeding value.

In conclusion, we may place side by side the pounds per acre of albuminoids obtained from the two and four cuttings of the alfalfa, respectively.

ALFALFA.—Albuminoids—Pounds per Acre.

——	South side.	North side.
First cutting	156	74
Second cutting	66	74
Third cutting	....	83
Fourth cutting	....	50
Total	222	281

It is somewhat remarkable that although we obtained a larger total yield, including a larger amount of dry matter, from the alfalfa than from the clover, the difference in albuminoids between that of the two cuttings and the four cuttings is the same, practically, for each crop.

CLOVER AND CLOVER ENSILAGE.

The especial value of clover as a roughage lies in the fact that it contains, in common with other legumes, a large proportion of flesh-forming constituents (albuminoids), thus allowing the use of a less weight of concentrated feed stuffs in the ration than when corn or hay forms the bulky part of the feed.

Though some farmers have not met with success in siloing clover, the causes of failure are apparently known and may be removed. Woll, in his *Book of Silage* says: 'Clover does not pack as well as the heavy, juicy corn, and, therefore, requires more weighting, or more depth in the silo, in order to sufficiently exclude the air.' Further, it is possible that the condition of the clover when put into the silo has much to do with the quality of the resulting ensilage, and regarding this point we may say that the best practice indicates that clover should be in full bloom. If allowed to remain uncut until the flower heads have withered, the clover is apparently too dry to make the best quality of ensilage. For the same reason the clover should not be allowed to wilt, but at once put into the silo.

Good clover ensilage has succulency and palatability in its favour, besides possessing, as we have said, a large proportion of the more valuable nutrients. Investigations, therefore, that seek to ascertain the best possible conditions of its preparation are worthy of our attention. Such investigations are being carried on by the Agriculturist of the Central Experimental Farm, and it is in connection with them that the analytical data about to be given have been obtained.

Mention has been made of the presence of a large percentage of nitrogenous compounds in clover, and it is in this fact that we find one difficulty in ensiling this crop. Nitrogenous substances are particularly susceptible to decomposition, especially in the presence of moisture and warmth. It was principally in order to trace the extent to which these substances had been altered by fermentation in the silo that analyses were made of the clover as put into the silo and of the ensilage taken from various parts of the silo some months later. There are and always will be certain losses in food value by ensiling, but these can be minimized to a large extent provided the clover is in the right condition and properly packed in the silo.*

The fermentative changes that take place in the silo affect both the non-nitrogenous compounds (starch, sugar, &c.), and the nitrogenous bodies. The former, to an extent depending on the degree of fermentation, are converted principally into carbonic acid and water—elements of no food value—and the latter into amides, compounds of much less value than the albuminoids. Since fermentation is kept in check by the exclusion of air, the construction of the silo and the close packing of the fresh material are matters of the greatest importance. With this outline account of the changes that take place in the silo we may proceed to consider the composition of the clover with that of its resulting ensilage, as depicted in table I.

TABLE I.—Analysis of Clover before and after Ensiling.

Constituents.	Clover as put in the Silo Aug. 31, 1900.	Clover Ensilage from centre of Silo Feb. 4, 1901.	Clover Ensilage from bottom of Silo April 11, 1901.
Moisture	76·47	82·60	77·98
Dry matter	23·53	17·40	22·02
Crude protein (nitrogen x 6·25)	3·56	2·94	2·96
Fat (ether extract)	·15	·18	·21
Carbohydrates (starch, sugar, etc.)	7·95	4·44	6·30
Fibre	9·71	7·98	10·15
Ash	2·16	1·86	2·40
Nitrogenous compounds—			
Albuminoids	2·88	1·53	2·08
Non-albuminoids	0·68	1·41	0·88

The experimental round silo in which the clover was preserved has the following dimensions: Height, 22 feet; diameter, 9 feet.

The clover was in full bloom at the date of cutting, August 31, 1900. The filling was made on three consecutive days, so that there would be but little difference in composition of the clover throughout the silo. After the ensilage had settled it filled the silo to a height of 15 feet.

* Woll, in summing up the evidence as to the relative losses in curing and ensiling clover, says: Clover silage is superior to clover hay on account of its succulency and greater palatability, as well as its higher feeding value. The last mentioned point is mainly due to the fact that all the parts of the clover plant are preserved in the silo, with a small unavoidable loss in fermentation, while in hay making, leaves and tedder part, which contain about two-thirds of the protein compounds, are easily lost by abrasion.

The first noticeable feature is the much smaller percentage of dry matter in the ensilage from the middle of the silo—the sample being taken in the centre, seven feet from the bottom—than in the clover or the ensilage from the floor of the silo. This points to a greater degree of fermentation and consequently greater loss of feeding elements in the centre than at the bottom of the silo. Weight for weight, this ensilage is not of an equal feeding value with clover. It is evident that the greater deterioration in the centre and upper part of the silo is due to the larger amount of air present, and this fact points to the value of deep silos and the packing firmly of the material. The loss has taken place both in the crude protein and carbo-hydrates (starch, sugar, gums, &c.). The crude protein consists of the albuminoids and non-albuminoid compounds (amides), and while there has been some loss in the total nitrogen, the breaking down of the former and formation of the latter explains chiefly the deterioration.

This has reference principally to the ensilage from the middle of the silo. The fat or ether extract has increased, but this is more apparent than real, for certain organic acids that are developed during the fermentation are unavoidably, by the process of analysis, determined with the fat.

Table II.—Analysis of Clover before and after Ensiling.

(Results on the water-free substance.)

Constituents.	Clover as put in the Silo Aug. 31, 1900.	Clover Ensilage from centre of Silo Feb. 4, 1901.	Clover Ensilage from bottom of Silo April 11, 1901.
Crude protein (nitrogen x 6·25)	15·19	16·94	13·44
Fat (ether extract)	·64	1·01	·95
Carbohydrates (starch, sugar, etc.)	33·74	25·46	29·58
Fibre	41·27	45·89	46·11
Ash	9·16	10·70	10·92
Nitrogenous compounds—			
Albuminoids	12·25	9·25	9·44
Non-albuminoids	2·94	7·69	4·00

Table II. allows us to compare closely the composition of the dry matter of the three samples, and furnishes much interesting information. While the crude protein has increased, demonstrating that the greater loss has been in the carbo-hydrates, the data for which confirm this statement, it is plain from the figures at the bottom of the table that there has been a marked decrease of the albuminoid and an increase of the non-albuminoid nitrogenous compounds. This, means a falling off in feeding value. There has been an increase in the fibre, ash constituents and ether-extract—the latter due to the development of organic acids.

These results are in close accord with those of other investigators. It is, however, probable they are more marked than if there had been a larger mass of ensilage. They certainly support the rules laid down for successfully ensiling clover, and indicate the desirability of large, deep silos, and of excluding air as far as possible by close packing of the material. By these means, fermentation will be largely controlled and excessive losses prevented.

CORN AND CORN ENSILAGE.

There are two methods of preserving corn for winter feeding in common use: by curing in shocks or stooks, and by ensiling. Both methods inevitably lead to a certain degree of loss of fodder, due to the destruction by fermentation of a portion of the carbo-hydrates and protein compounds. Many and careful experiments made and repeated in the United States in order to compare the respective merits of the two plans, have shown that the losses by field curing (stooks), as a rule, exceed those in the silo. Under favourable conditions of ensiling—that is, with a fairly mature corn, and a well constructed silo—the loss in food value by fermentation is probably less than 15 per cent, but in shocked corn the loss appears to be seldom less than 20 per cent.*

It has been abundantly shown that the dry matter of stooked corn and corn ensilage has practically an equal digestibility. We have, however, two important qualities more highly developed in ensilage than in stooked corn, viz., succulency and palatability, and this fact makes the former a much more desirable food, especially for dairy cows. On the score of labour and loss in feeding, it is generally held by practical men that ensiling is the much more economical plan.

The object in the present investigation, as in the case of the clover just recited, was to ascertain the extent to which the feeding value of the corn had suffered by ensiling.

The total loss that ensued is not deducible from our data, but the results obtained allow us to compare, weight for weight, the corn as put into the silo with the corresponding ensilage produced.

Three samples of the corn as it was being put into the silo were taken on the 14th, 15th and 27th of September, 1900, respectively. They represented the quality of the corn, (1) at the bottom of the silo ; (2) 22 feet from the bottom of the silo, and (3) 28½ feet from the bottom, or 1½ feet from the top of the silo. The silo is 17 feet in diameter and 30 feet high and was filled to the top. The weight of corn ensiled was, approximately, 150 tons.

The samples of ensilage, which were intended should correspond with the foregoing, were collected on January 31, March 1, April 3, and April 6, 1901. The January sample, it was expected, would represent the corn at the top of the silo (September 27); the March sample, that from the centre of the silo (September 15), and the two April samples, one from the bottom and the other 2½ feet from the bottom of the silo, that as first put into the silo (September 14).

The composition of the three samples of corn and four of ensilage is given in table I., the data of which allow us to compare the feeding values of the corn and corresponding ensilage weight for weight, and furnish us with an insight into the changes that occurred during the ensiling process. In table II. these changes are made more apparent by calculating the nutrients upon the water-free substance.

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* The extent of the deterioration in shocked corn will depend upon the condition of the corn when cut, the length of time it is left shocked in the field and the character of the weather during that period.

TABLE I.—Analysis of Corn before and after Ensiling.

Constituents.	A.—Corn as put in the Silo; sample from bottom of Silo, Sept. 14, 1900.	B.—Ensilage sample from floor of Silo, April 6, 1901.	C.—Ensilage sample taken 2½ feet from bottom of Silo, Apl. 3, 1901.	D.—Corn as put in the Silo; sample taken 22 feet from bottom, Sept. 15, 1900.	E.—Ensilage sample taken 11 feet from bottom of Silo, Mar. 1, 1901.	F.—Corn as put in the Silo; sample taken 1½ feet from top, Sept. 27, 1900.	G.—Ensilage sample taken 2 feet from top of Silo, Jan. 18, 1901.
Water	81·83	81·98	76·71	83·43	77·41	80·67	84·95
Dry matter	18·17	18·02	23·29	16·57	22·59	19·33	15·05
Crude protein (nitrogen x 6·25)	1·63	1·11	1·70	1·63	2·09	1·88	1·16
Fat	0·10	0·10	0·26	0·08	0·17	0·06	0·15
Carbohydrates	9·72	9 33	12·96	8·65	11·08	10·07	6·68
Fibre	5·49	6·37	8·06	4·88	7·82	5·83	5·63
Ash	1 23	1·11	1·31	1·33	1·43	1·49	1·43
Nitrogenous compounds—							
Albuminoids or true protein	1·25	0·66	0·85	1·32	0·84	1·56	0·77
Non-albuminoids (amides, &c.)	0 38	0·45	0·85	0·31	1·25	0·32	0·39

The more important facts to be noted in connection with the percentages of dry matter are observable from the following tabular summary:—

	Dry Matter Per cent.
Bottom of Silo—	
Corn	18·17
Ensilage, floor of silo	18·02
Ensilage, 2½ feet from bottom	23·29
Middle of Silo—	
Corn	16·57
Ensilage, 11 feet from bottom	22·59
Top of Silo—	
Corn	19·33
Ensilage, 2 feet from top of silo	15·05

In the corn, the dry matter varied from 16·57 per cent to 19·33 per cent; in the ensilage, from 15 per cent to 23 per cent.

There is a very close accordance between the percentages of dry matter in the corn as first put into the silo and the ensilage as taken from the floor of the silo; such changes as have taken place have evidently not altered the material in this respect.

The most remarkable data are the percentages for the ensilage samples C (April 3), and E (March 1), in which the dry matter exceeds by 5 per cent or more that of the corn put into the silo (A and D). It is difficult to understand the character of changes that could bring about such a result. The explanation appears to lie in the fact that there was a considerable loss by leakage from the silo, owing to the unavoidably immature condition of the corn. Such would tend naturally to increase the percentage of dry matter in the ensilage.

In the ensilage taken from the top of the silo (G) we find 4 per cent more moisture than in the corn used, resulting necessarily in a similar decrease of the dry matter. This is due, we presume, to the combustion (by fermentation) of the dry matter, in which the nutrients—starch, sugar, &c. (carbo-hydrates) have suffered most.

The effect of ensiling upon the nitrogenous compounds is a marked one. The albuminoids or flesh-formers are largely reduced to the less nutritive form, amides.

The changes in the relative proportions of the nutrients are more easily followed from a perusal of the percentage composition of the dry matter of the various samples, as given in table II.

TABLE II.—Analysis of Corn before and after Ensiling.

(Results on water-free substance.)

Constituents.	A.—Corn as put in the Silo; sample from bottom of Silo, Sept. 14, 1900.	B.—Ensilage sample from floor of Silo, April 6, 1901.	C.—Ensilage sample taken 2½ feet from bottom of Silo, Apl. 3, 1901.	D.—Corn as put in the Silo; sample taken 22 feet from bottom, Sept. 15, 1900.	E.—Ensilage sample taken 11 feet from bottom of Silo, Mar. 1, 1901.	F.—Corn as put in the Silo; sample taken 1½ feet from top, Sept. 27, 1900.	G.—Ensilage sample taken 2 feet from top of Silo, Jan. 18, 1901.
Crude protein (nitrogen x 6·25)	8·94	6·18	7·28	9·69	9·23	9·63	7·71
Fat	0·54	0·56	1·12	0·46	0·74	0·33	1·00
Carbohydrates	53·52	51·75	51·38	52·36	49·10	52·18	44·34
Fibre	30·23	35·35	34·59	29·45	34·61	30·14	37·43
Ash	6·77	6·16	5·63	8·04	6·32	7·72	9·52
Nitrogenous compounds—							
Albuminoids or true protein	7·00	3·64	3·66	7·81	3·72	8·13	5·11
Non-albuminoids (amides, &c.)	1·84	2·54	3·62	1·88	5·51	1·50	2·60

The Composition of the Dry Matter of Corn and its Resulting Ensilage.

Bottom of Silo.—Contrasting ensilage B (floor of silo) with corn A, we notice that the chief differences are in the nitrogenous compounds. There has been some loss in nitrogen during ensiling, amounting to, approximately, .5 per cent, calculated on the dry matter. A much more serious loss from the feeding standpoint is to be noticed in the reduction of the albuminoids into non-albuminoid substances (amides).*

In the corn as placed in the silo (A), 80 per cent of the total nitrogen present exists in the albuminoid form, whereas in the ensilage taken from floor of silo (B), but 59 per cent is present in this more valuable condition.

Comparing the corn (A) with ensilage (C), taken 2½ feet from the bottom of the silo, we find that a further reduction has taken place, and only 50 per cent of the nitrogen compounds exist as true albuminoids.

The crude fibre has increased to the extent of from 4 to 5 per cent by ensiling. The other changes are insignificant, the principal one being a loss of about 2 per cent of the carbo-hydrates.

Middle of Silo.—Comparing the composition of the dry matter of the corn (D) with the resulting ensilage (E) taken 22 feet from the bottom of the silo, we may make the following deductions:—

The crude protein, obtained by multiplying the total nitrogen by the factor 6·25, is approximately the same in both, but a reference to the relative proportions contained therein of albuminoids and non-albuminoids reveals that there has been a notable reduction of the former to the latter. Thus, in the corn, 80 per cent of the nitrogen is in the more valuable albuminoid form, whilst in the resulting ensilage only 40 per cent is so present.

*The comparative food value of the albuminoids and amides stands approximately at 2·5 : 1, in other words the latter compounds may be considered about on a par with the carbo-hydrates.

The fat is apparently higher in the ensilage, but as organic acids, as already explained, are by the process of analysis estimated with the fat, this gain is more apparent than real.

There is a difference of about 3 per cent of carbo-hydrates in favour of the corn.

The fibre has increased by ensiling to an extent of about 5 per cent. This, of course, does not mean that there has been any development of fibre, but that other nutrients have disappeared, necessarily increasing the proportion of this constituent in the dry matter.

Top of Silo.—We notice, first, a reduction of 2 per cent of crude protein by ensiling. Examining more closely into its character it will be seen that in the corn (F) 84 per cent of its nitrogen exists as albuminoids,* whereas in the ensilage (G) this was reduced to 65 per cent. By comparing these data with those stated for the ensilage at the bottom and in the middle of the silo, it will be noted that the conversion of the albuminoids, and hence the reduction in food value, has not apparently been so great in the upper part of the silo. At all events, we can say that the ensilage in the latter contains a larger proportion of albuminoids than that in the lower portions of the silo.

Again, the apparent gain in fat is to be observed.

The dry matter of the ensilage shows about 8 per cent less carbo-hydrates than the dry matter of the corn as put into the silo, showing that fermentative changes have been active.

The fibre, the least of all the nutrients to be effected by ensiling, as in the instances already discussed, has been increased in the sample by about 7 per cent. This results chiefly from destruction of the carbo-hydrates.

In considering the foregoing deductions from this research it should be borne in mind that the corn as put into the silo was less mature than usual. The season of 1900 was not so favourable for maturing this fodder crop, as, for instance, that of the present year, when the corn as cut contained approximately 22 per cent of dry matter. This fact of the larger percentage of water in the crop of 1900 (the one under consideration) no doubt accounts in a large measure for the extent to which deterioration had taken place in the food value of the ensilage. It has been well established that mature corn, that is corn that has come to the glazing condition, yields ensilage of a greater feeding value than corn siloed when less mature. The destructive changes we have noted are largely accelerated by the great percentage of moisture in immature corn.

Further, it must be remembered that we have been considering the values of the corn and resulting ensilage compared, weight for weight. Our data do not allow us to make any inferences as to the total loss of nutrients that may have occurred in the silo.

THE GRASS PEA (*Lathyrus sativus*).

In the early part of the present year a request was received from Mr. W. J. Gerald, Deputy Minister of Inland Revenue, Ottawa, asking us to investigate the correctness of the statement that the grass pea possessed poisonous qualities and could not be fed with impunity. This pea, or rather vetch, is now being somewhat extensively grown in certain districts of Ontario, owing to its prolific character and alleged immunity to the attacks of the pea weevil. It has thus found its way, perhaps to the extent of 2 per cent or thereabouts, into the peas exported to England, from whence the objection above referred to came.

It is the grain of this plant that, according to many learned authorities, causes the disease known as lathyrismus, a form of paralysis, which occurs in India when, in times of famine, large numbers of the natives are obliged to live upon it, practically,

*In the corn samples A and D this percentage was approximately 80. The larger proportion in the corn (F) is due to the more mature condition of the plant when cut—some twelve days later than A and D.

exclusively. Much has been written upon the subject and many theories advanced as to the nature of the poison. Statements have appeared to the effect that a volatile alkaloid, which has a toxic action, has been isolated from the seed, but all the announcements to the effect that a poisonous principle has been identified—and they are several—appear to lack definiteness and verification. As might be supposed, the matter has received investigation at the hands of chemists and physiologists. In this connection we may state that Professor Wyndham R. Dunstan, director of the laboratories of the Imperial Institute, England, has for some time past been engaged on this difficult problem, working on Indian seed, so far, we understand, without being able to isolate any poisonous principle. We may, therefore, say that as yet nothing of a definite character has been evolved from chemical examination, and that the real nature of the cause of lathyrismus is shrouded in mystery, though there is a strong probability that the thorough researches of Professor Dunstan now in progress will eventually furnish data of a satisfactory nature.

In the endeavour to ascertain whether the grass pea as grown in Canada is identical with that of India, plants were grown by us from seed obtained in western Ontario and from seed which came from the north-western provinces of India, the latter being kindly furnished by Professor Dunstan. The bloom of these plants was examined for us, in the absence of the botanist of the farms, by Professor Bemrose, of the Pharmaceutical College, Montreal, to whom I am indebted for a most careful report on the same. He says that there are no essential or important differences to be observed between them, and that both belong to the same species, *L. sativus*. The flowers from the Indian seed are blue, while those from the Canadian seed have proved with us invariably white. This, however, is not regarded as denoting any fundamental or specific difference, since the flowers of many members of this order are known, under the same conditions, to vary in colour—that is, may appear as white, blue or purplish.

Certain differences are, however, to be noted between the Indian and Canadian seed. Both are alike in having the flattened wedge-shape, but the former are dark gray to very dark brown in colour and mottled, and possess a dark or black line running two-thirds round the seed, while the latter, as far as is known to the writer, are invariably white or greenish-white. Whether these marked characters denote varietal differences it would be hazardous to say, but at all events they are worthy of mention in a consideration of this subject.

We submitted the Canadian grown seed to a very careful and thorough investigation, following the elaborate scheme of Dragendorff for the isolation of alkaloids, glucosides, &c., and also employed several other special processes for the detection of poisonous principles. Quantities varying from 300 grams to 1,500 grams (11 ounces to 3½ pounds) were used in the various processes of analysis. In no case, however, was any poisonous principle or alkaloid obtained, all the results being negative in character.

A feeding test was then instituted under our immediate supervision. Two fowls (a cock and hen) were fed on this grain, practically exclusively from April 17 to June 28, 72 days. At the end of this period both fowls were in excellent condition, lively and healthy. During the experiment they always had a good appetite and ate the peas with avidity. They were kept on other grain, principally oats, from June 28 to August 20, in order to notice if any after effects of the pea ration might manifest themselves, but the fowls remained healthy. In connection with this experiment the following data were obtained and will be found of interest in showing that no injurious results followed the consumption of the grass pea.

During the 72 days of trial the fowls ate 23 pounds 3 ounces of grain. All that they would eat was given to them twice daily, the amount varying from 1½ ounces each at first to 3½ ounces as they became accustomed to the feed, the average being from 2½ to 2¾ ounces each per diem.

The hen laid 13 eggs during the time of the experiment, in spite of the confined quarters and the lack of that variety of food usually considered necessary for egg production.

The weights of the fowls as taken during the trial were as follows :—

—	Cock.		Hen.	
	Lbs.	Oz.	Lbs.	Oz.
April 27	3	1½	2	11½
July 2	3	15	3	15
August 20	3	15	4	1

It is thus seen that both fowls gained in weight on this diet.

Subsequent to the foregoing experiment we made the following investigation to ascertain if the oil or fat of this pea possessed any toxic properties. A considerable quantity of the finely ground peas was repeatedly exhausted by redistilled gasolene. Finally, this solvent was allowed to evaporate spontaneously and the resulting fat, weighing 1½ grams, was made up with starch and several capsules filled with the mixture. These capsules were slipped down the throat of the hen. Though a careful watch was kept for more than a week, no harmful results were noticeable, the hen remaining bright and lively and evidently in good health.

We purpose continuing this research, but it is satisfactory to note that all the work done points to the non-injurious character of the Canadian grown seed.

It may be added that we have received the testimony of several farmers in western Ontario who have largely fed this pea. In no instance have they recorded any injurious results or symptoms, and they report it as a valuable and harmless feed for all classes of stock.

In conclusion, it will be of interest to place side by side the food analysis of the Canadian and Indian grown seed. The former has been made in our laboratories; the latter is taken from Watt's Dictionary of Economic Products of India:

	Canadian.	Indian.
Moisture	11·51	10·10
Albuminoids	26·12	31·90
Fat	·93	·90
Carbo-hydrates	53·78	53·90
Fibre	5·04	
Ash	2·62	3·20
	100·00	100·00

The chief point of difference lies in the percentage of albuminoids, which in the Indian seed appears to be abnormally high, and there seems some ground for doubting the correctness of this determination.

CORN BY-PRODUCTS: GLUTEN MEAL, GLUTEN FEED, ETC.

We have reason to know from correspondence that our dairymen and stock-feeders are yearly paying more attention to the quality of the feed they use, and especially to that which it is necessary to buy to supplement the home-grown fodder. This is an encouraging sign, for, speaking generally, the profitable production of milk and flesh can only follow the economic purchase and use of the 'concentrates' of the ration, which we notice have recently risen considerably in price. This demands primarily a knowledge of the composition of these materials.*

* Information regarding the functions of the various constituents of fodders in the animal system, their digestibility and the desirability of a balanced ration, has been furnished in reports of this Division for 1890, 1892 and 1898.

These as has been stated, are bought to supplement and balance the coarse fodders of the farm, or, in other words, to furnish protein and fat, and consequently it is according to the percentages of these constituents that they must be valued. Prominent among them are the various milling by-products of wheat, oats, and Indian corn. It is of the latter, since they are comparatively new in our markets that we shall here treat, giving analyses of several made during the past year in the farm laboratories.

The establishment in Canada of starch factories has resulted in the production of a number of materials derived from the corn kernel which can be used to advantage as cattle feed, but which differ in their value according to the part of the grain entering into their composition.

The corn kernel, for our present purposes, may be considered to consist of (1) the husk or skin, which is fibrous; (2) a layer of more or less yellow cells containing a large proportion of gluten; (3) the larger mass or body of the kernel, nearly pure starch; and (4) the germ, rich in protein, but especially so in fat and mineral matter. In the preparation of the starch, all save this constituent find their way into the by-products, sometimes singly, sometimes mixed. Though all manufacturers do not adopt precisely the same terms, the following have been commonly accepted: Gluten meal, especially rich in protein, and also containing a large proportion of oil ; Germ meal, the dried and ground germ, and consequently high in protein and very rich in oil ; Corn oil cake, and corn oil meal, the germ from which the large amount of oil has been expressed, but still very rich in this constituent ; Corn bran, the hulls or skin of the corn, much lower in feeding value than any of the preceding ; and Gluten feed, which consists of all the by-products mixed, and may be regarded as corn minus its starch, containing large percentages of protein and oil, but not so rich in either as gluten meal.

These definitions will prove useful as a guide, but since some manufacturers employ the terms rather loosely, as, for instance, gluten meal to designate the mixture of all the by-products (gluten feed), and further, that methods of preparation differ, a fact which affects the composition of the product, they should not be depended upon solely. An analysis showing the percentages of protein and oil should be asked for, so as to allow the purchasers to estimate the comparative values of the brands offered.

The subjoined table gives the composition of the more important brands produced in Ontario, as determined from samples obtained from the manufacturers or their agents. In several instances results from two or more samples of the same brand received at different dates are given.

ANALYSIS of Gluten Meals, 1901.

No.	Brand.	Manufacturer.	Moisture.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.
			p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
1	Maize gluten meal, Jersey Brand.	St. Lawrence Starch Co., Port Credit, Ont.	5·93	18·03	7·25	64·10	4·04	·65
2	" "	" "	8·76	17·31	7·69	61·33	4·36	·55
3	" "	" "	7·03	16·44	6·11	64·01	5·75	·66
4	Gluten meal	Brantford Starch Co., Brantford	6·61	17·18	9·95	59·58	6·01	·67
5	Corn gluten meal..	Edwardsburg Starch Co., Cardinal, Ont.	5·25	36·68	11·05	43·83	1·54	1·65
6	" "	" "	7·68	37·87	6·80	45·49	1 05	1·11
7	Corn oil cake*......	" "	3·21	21·19	36·49	31·65	6·61	·85
8	Germ feed†...............	" "	4·62	13·81	8·53	56·45	15·79	·80

* This sample is evidently not a normal 'oil cake,' but rather the germs from which a small percentage of the oil has been expressed.

† This should be known rather as corn bran, since it consists largely of the hulls or skin of the corn.

Although corn is a grain poor in protein and mineral matter, and, therefore, not suitable for use as the sole grain, it is seen that many of its by-products are very rich in these constituents, besides containing large amounts of fat. These products may, therefore be considered as valuable adjuncts to our list of concentrated feeds, wholesome and nutritious, and eminently adapted to forming a part of the grain ration, both both for milch and fattening stock.

CATTLE FEED.

At the request of the Department of Marine and Fisheries, Ottawa, analysis has been made of two samples termed 'Cattle Feed,' to ascertain their feeding value. The object of the investigation was to learn which would be the more nutritious as food for cattle in transport to England.

These 'feeds' consist chiefly of crushed or partially ground oats and Indian corn, the proportion of the former to the latter being apparently somewhat greater in No. 1 than in No. 2. A few weed seeds and small grain (cereals) are to be observed in both samples, though there are no indications of 'mill sweepings' having been used in their preparation. A general examination of the samples showed a strong similarity in composition, but that of No. 1 is probably somewhat the better of the two. This conjecture is borne out by the chemical data, which are as follows:—

	No. 1.	No. 2.
Moisture	9·18	9·30
Protein	12·81	10·75
Fat	3·90	4·63
Carbo-hydrates	61·09	61·28
Fibre	10·00	11·37
Ash	3·02	2·67
	100·00	100·00

The chief points of difference are, (1) that No. 1 is somewhat the richer (2 per cent) in albuminoids and that No. 2 contains a little more fat, approximately, ·75 per cent.

The albuminoids (protein) and fat constitute the most valuable nutrients of a fodder, and are usually assumed to be worth, weight for weight, 2½ times the carbohydrates (starch, sugar, &c.). On this basis we find by calculation that one ton of No. 1 feed is equal in feeding value to 1 ton 63 pounds of No. 2. If No. 1 is worth $15 per ton, then the value of one ton of No. 2 would be $14.54.

In arriving at these conclusions, we have been obliged to assume the feeds to be of equal digestibility, and the probability is that in actual feeding the difference in favour of No. 1 will be a little greater than shown by the foregoing computations.

RICE FEED.

This material, a by-product in the preparation of rice, is of considerable feeding value. Rice hulls are very fibrous and woody, but the bran coats of the seed, the germ and the rice 'polish' are all more or less rich in protein, fat and mineral matter.

The sample examined was forwarded by Mr. Peter Reid, Chateauguay Basin, Que., who states that it was obtained from the Mount Royal Milling Company's mill at Cote St. Paul. He gives the price (Nov. 20, 1901) at $18 per ton, and says : 'The meal is made from the husk of the grain, corresponding to the bran of wheat, I presume, together with particles of the grain broken off when running through the husker and polisher.'

Composition of Rice Feed.

Moisture	8·39
Protein	12·31
Fat	12·39
Carbo-hydrates	47·51
Fibre	11·11
Ash	8·29
	100·00

We should presume this to be an excellent feeding stuff for dairy cows. Its mechanical condition is favourable to the digestion of the feed, and its composition is such that all the desired nutrients are furnished in good proportion.

In 1892 we analysed a sample designated 'Rice Meal,' forwarded from Victoria, B.C. Its composition was as follows:—

Moisture	11·47
Protein	11·34
Fat	12·75
Carbo-hydrates	50·31
Fibre	6·95
Ash	7·18
	100·00

This sample evidently contained a smaller proportion of hulls than the 'feed' under consideration, but otherwise they are of a similar character.

For the purposes of comparison, we insert the following data of rice and its products, taken from 'Analysis of American Feeding Stuffs, Jenkins & Winton.'

—	Water.	Protein.	Fat.	Carbo-hydrates.	Fibre.	Ash.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Rice	12·4	7·4	·4	79·2	·2	·4
Rice meal	10·2	12·0	13·1	51·2	5·4	8·1
Rice hulls	8·2	3·6	·7	38·6	35·7	13·2
Rice bran	9·7	12·1	8·8	49·9	9·5	10·0
Rice polish	10·0	11·7	7·3	58·0	6·3	6·7

BIBBY'S CREAM EQUIVALENT—CALF MEAL.

An experiment was recently conducted in calf feeding at the Central Experimental Farm, in which this material formed one of the feeds under trial. It was, consequently, deemed advisable to ascertain its feeding value, as far as that could be learnt from a chemical and microscopic examination. This is an English preparation, used as a partial substitute for milk in the rearing of calves, and costs $3.50 per cwt. at Ottawa. It has a slight, pleasantly aromatic odour in which that of locust bean is particularly noticeable.

Composition of Calf Meal.

Moisture	10·40
Protein	12·75
Fat	11·19
Carbo-hydrates	57·88
Ash	3·08
Fibre	4·70
	100·00
Water soluble extract	17·29
Saccharine matter, in water soluble extract	6·40

A microscopic examination reveals the presence of linseed meal and bean (probably locust) meal as the chief ingredients.

It will be of interest to compare the ratio of the chief constituents of this food with that given by milk, in order to learn how far this substitute approximates milk in the balance of its nutrients. To do this we shall have to assume that the digestibilities of the protein, fat, and sugar in both are equal. This is not strictly accurate, and gives an advantage to the calf meal, but is rendered necessary by the fact that we have no data as to the digestibility of this material.

Approximate Ratio of Nutrients in Milk and Calf Meal.

	Protein.	Fat.	Carbo-hydrates.	Ash.
Milk	10	11	13	2
Calf meal	10	9	45	2

Save for the excess of carbo-hydrates, the balance of nutrients in the calf meal is very well preserved. Only one-ninth of the carbo-hydrates, however, is present as sugar (6·40 per cent), and, therefore, immediately digestible, or rather, assimilable ; whereas in milk, the sugar constitutes the whole amount of the carbo-hydrates, and is entirely digestible. This, in a measure, affects the calculation, but yet not to such an extent as to prevent drawing the conclusion that in the essential relationship of the nutrients, and more particularly between the protein and fat, this substitute is not unlike milk.

Of course, such feeds, no matter how well compounded, can only be considered, at best, as partial substitutes for milk, and the proportion in which they can be advantageously used will depend not only on their composition, but also on their price.

CANADIAN POTATO STARCH.

At the request of the Inland Revenue Department, Ottawa, we have submitted to a careful analysis a sample of potato starch from the mills at Baie du Febvre, Yamaska, Quebec.

A chemical examination as to the purity of the starch afforded the following data:—

Moisture	16·70
Ash or mineral matter	·67
Nitrogen	·017
Fibre or cellulose	None.

Moisture.—According to Allen (*Commercial Organic Analysis, Vol. I., p. 418*) 'The proportion of water in air-dried starch averages about 18 per cent, but is liable to variation.' It is clear from this statement, therefore, that the sample under consideration is in this respect quite equal to the standard brands upon the market.

Ash or Mineral Matter.—Pure starch does not contain any ash, but commercial starch, since it usually possesses traces of foreign matter, such as vegetable fibre, nitrogenous substances, &c., frequently shows a small percentage of mineral matter derived from these constituents. The very small amount we have found present in this sample would not, in our opinion, detract in any way from its value for those purposes for which potato starch is employed. In this respect, however, it seems to be scarcely equal to some of the finer starches used in cooking.

Nitrogen.—The above recorded percentage shows that this sample contains traces only of albuminoid matter.

Fibre.—Analysis did not reveal the presence of any appreciable amount of vegetable fibre.

Reaction.—This starch has a slightly acid reaction, though no traces of mineral acids could be detected. Presumably this trace of acidity is developed during its manufacture. Most probably this feature would not affect in any way the value of the starch, but on this point there are no data at our command. Such samples of corn and rice starch as we have examined have been invariably found to be slightly alkaline.

Microscopic Examination.—A few fragments of foreign material, evidently vegetable tissue, are discernible. Many brands of commercial starch contain such traces, their presence being due to imperfect separation in manufacture, but the very finest qualities are stated to be so pure in this respect as to be free even from traces of fibre or tissue.

CANADIAN BUTTER AS EXPORTED.

In March of the present year we received a request from the Department of the Secretary of State, Ottawa, to analyse and report upon a sample of Canadian butter that had been condemned and prohibited from sale in Cuba on the ground that it was adulterated, the custom's analyst at Havana having certified that it contained 35 per cent oleomargarine. Unopened samples of the butter from the condemned consignment had been returned at the instance of the Secretary of State, and these were forwarded to the Farm laboratories. Having submitted the butter to a very careful and complete examination, we made the following report, which in the fullest way bears out the claim of the manufacturer and exporter, that the butter is pure and unadulterated.

ANALYSIS AND REPORT.

Butter received from the Department of the Secretary of State, Dominion of Canada, and contained in a 2-lb. tin, hermetically sealed and bearing the following marks:—'Extra Finest Canadian Butter, Pierre de Bacourt, Central Creamery at Scott Junction, Dorchester, Canada.' Written in ink on bottom of tin is '9478 R. Truffin & Co., ss. *Mexico.* September 17, 1900, 4 cases, out of case No. 636.' Tin bound with tape and seals intact 'Deputy Collector (official) of Customs.'

Analysis.

Fat	83·15
Water	10·70
Salt	4·02
Curd, by difference	2·13
	100·00

Estimations on the dry, filtered Butter-fat.

*Reichert No. (volatile fatty acids)	27·45
Saponification equivalent (Koettstorfer)	249·3
Specific gravity at 100° F.	·912

* Corresponding to 5 grams fat.

Paraffin could not be detected, even in traces.

The above data are entirely in accordance with those of pure, unadulterated butter, and conclusively prove the absence of oleomargarine or other foreign fats.

CHEMISTRY OF INSECTICIDES AND FUNGICIDES.

ANALYSIS OF CERTAIN BRANDS OF LYE.

Solutions of lye are used for the destruction of insects and cleansing the bark while the wood is still dormant, that is, before the leaves appear. In response to requests from orchardists, both in Ontario and Nova Scotia, for information regarding the relative values or strengths of the better known brands of lye sold in Canada, we have during the past season submitted to analysis, Gillett's 'Perfumed 100 per cent Lye,' Greenbank's 'Soapmaker,' Babbitt's 'Pure Potash or Lye,' and a sample of 'Rock Potash' obtained from a wholesale drug firm in Montreal.

Our results may be tabulated as follows:—

	Alkali Present as Caustic Soda.	Alkali Present as Carbonate of Soda.
Gillett's Perfumed 100 per cent Lye	92·48	2·77
*Babbitt's Pure Potash or Lye	85·15	4·98
Greenbank's Soapmaker	71·44	5·51

*There is no potash in Babbitt's brand, the alkali present being soda.

The analysis of Rock Potash showed:—

Alkali, as caustic potash	36·72
Alkali, as carbonate of potash	43·24
The total potash present, calculated as oxide, is	69·31

These, of course, are all commercial products and consequently contain varying amounts of chloride of soda, and in some instances certain sulphates, besides oxide of iron and alumina. These impurities, however, do not interfere with the efficiency of the material for the use here considered. The relative strength of the lyes as a wash is indicated primarily by the amount of caustic alkali contained, and, secondarily, by that of the alkali as carbonate. The use of Rock Potash would furnish an important fertilizing element, absent in the ordinary brands of lye upon the market.

GAS-LIME.

Gas-lime is a by-product in the purification of illuminating gas, and may frequently be obtained for the cartage. It has a certain value for the destruction of the larvæ of noxious insects, slugs, centipedes, &c., in the soil, but must be employed with some caution owing to the fact that when fresh from the gas works it is injurious to vegetation. These injurious properties which really give this material its insecticidal value, are chiefly due to certain sulphur compounds (principally sulphide of lime), but sometimes in a measure to more or less tar and other organic compounds that may be present. Thoroughly weathered gas-lime, as when left in small heaps on the field for two or three months, however, has lost for the most part its injurious qualities by

the more or less complete conversion of the sulphide and other sulphur compounds into sulphate of lime (gypsum), which as we know, is a valuable fertilizer especially for soils deficient in lime. To this end, therefore, it is advisable to spread the gas lime, or to place it in small heaps, on the field in the autumn, ploughing or harrowing under the following spring.

As an insecticide, pure and simple, its action of course will be more pronounced if at once (without weathering) it is ploughed or harrowed into the soil ; but by so doing there would be some danger of injuring vegetation.

Naturally, gas-lime is variable in composition, and consequently it is difficult to state the limit to which it can be safely applied, but the usual amount will be between 2 and 6 tons per acre, and speaking generally we should advise a trial with the lesser quantity. In Holland it has been used freely on heavy clay soil to the extent of 2 to 2½ tons per acre. In England, applied in autumn from 2 to 4½ tons per acre. It is stated to act injuriously if applied directly to grass lands during the growing season.

An analysis of gas-lime made in the farm laboratory appears in the report of this Division for 1890, to which is appended an account of the value of this material from the standpoint of a fertilizer.

NOTES ON INSECTICIDAL MIXTURES.

The following information in answer to inquiries submitted through the Entomological Division, is inserted as of general interest to fruit growers :—

Proposed Mixture of Lime-wash and Soft Soap.—The correspondent wished to know if the good qualities of these materials could not be obtained in the one mixture, and thus half the labour of application saved. Experiments were made in the laboratory, using thin lime-wash and whale-oil soap, and the results obtained confirmed our conjecture as to the unsuitability of the mixture.

A curdy lime-soap is precipitated, which in our opinion would not be so effective as the original (potash) soap. Further, we believe, the mixture would be found to have very poor adhesive qualities.

The Addition of Washing Soda or Lye to the Soft Soap solution.—We were asked if there would be any advantage in adding lye or sal soda to the soft soap wash.

There is no chemical reason against this practice, and the mixture would be stronger, *i.e.*, more caustic, than the soap solution alone. There must, however, be a limit to the proportion in which lye could be so used, for if the mixture were too caustic there would be injury to the bark. Naturally, one would expect a soft soap solution, strengthened with lye, to be more effective as an insecticide than the former alone or with washing soda.

The relative value of Soft Soap and Whale-oil Soap in insecticidal preparations.—It is scarcely possible to say from the chemical standpoint which of the two—soft soap or whale-oil soap—would be the more effective, though we might expect that a determination of the excess of free alkali present would give an indication in that direction. This, no doubt, varies somewhat in each sample. Whale-oil soap most probably owes its virtue in a large part to its qualities as a deterrent, and in this respect it must certainly be considered as more effective than a soft soap made with a vegetable oil.

On the use of Sal Soda instead of Lime in the Paris green mixture.—In answer to the inquiry: 'Can sal soda be used instead of lime in the preparation of Paris green mixture?,' the following information is submitted:—

When Paris green mixed with water (at the usual rates of 1 pound to 100-200 gallons) is applied to certain classes of delicate foliage (as of stone fruits) a corrosive or 'burning' effect has been noticed to follow, the leaves showing decided marks of injury as the insecticide dried upon them. This is due to a certain small percentage of free (uncombined) arsenic. This injurious effect may be entirely overcome by the addition

of a small quantity of lime, the usual amount advised being 1 pound to each 1 pound of Paris green, though this is probably much more than is absolutely necessary.

Sal soda (more commonly known as washing soda) should chemically effect the same purpose as the lime, though in the apparent absence of recorded experimental data it would not be wise to generally advise the substitution. Arsenate of soda, as is well known, is more or less injurious to foliage, but the compound formed in the mixture under discussion would rather be arsenite of soda, regarding the action of which on foliage I cannot find any reference. I, however, am of the opinion, drawn from a general consideration of the whole subject, that lime would be better, or rather, safer to use, since the soda-arsenic compounds are easily soluble in water, and hence more likely to affect the foliage.

To obtain the neutralizing effect of 1 pound of slaked lime, approximately 4 pounds or ordinary crystallized washing soda would be required. This quantity of lime, however, as already pointed out much exceeds that absolutely necessary, and most probably 2 pounds washing soda (equivalent to ½ pound of lime) would be ample. An experiment recently made here showed that when 4 pounds of sal soda in solution were added to a mixture of 1 pound of Paris green in 160 gallons of water, considerable traces of arsenic went into solution ; in other words, that there had been a slight decomposition of the Paris green. When, therefore, through inability to conveniently obtain lime, sal soda is substituted, we should advise not more than 2 pounds to each pound of Paris green ; but in view of the general results of soluble arsenic compounds on foliage, and in the absence of any definite data from spraying experiments with the mixture under discussion, it would be safer to use lime whenever possible. The arsenate of lime that may be formed in the fluid from following this course has been shown to be non-injurious to foliage and an excellent insecticide.

It might be pointed out that when Paris green is used in Bordeaux mixture there is no need for further addition of lime, to prevent injury to foliage, and that in this mixture both the fungicidal and insecticidal properties are unimpaired.

WELL WATERS FROM FARM HOMESTEADS.

For the year November 30, 1900, to December 1, 1901, 96 samples of well waters have been received for analysis. From the tabulated statistics in the letter of transmittal it will be seen that while the largest number of samples were received from Ontario, farmers in every province of the Dominion have availed themselves of the privilege extended to them in this matter.

Owing to insufficiency in the quantity sent, to dirty bottles or corks, &c., it was found impossible or inadvisable to submit to analysis a number of the waters received, and in this connection it may be well to again point out that the necessary instructions to be followed in collecting and shipping the sample will be forwarded to farmers and dairymen upon application.

We would further state that the examination of mineral or supposed medicinal waters is not undertaken.

Each water, as analysed, is reported upon to the sender and such advice given or suggestions made regarding the water supply as the results would justify. These reports cannot be inserted here, for want of space, but a brief statement regarding the quality of the waters will be found in the last column of the appended table of data.

Of the 64 waters submitted to complete analysis, 19 were reported as pure and wholesome, 18 as decidedly suspicious and probably dangerous, 16 as seriously polluted, and 11 as saline waters.

ANALYSIS OF

RESULTS STATED IN

Number.	Locality.	Marks.	Date.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen in Nitrates and Nitrites.	Chlorine.
			1901.				
1	Elgin, Ont.	R. B. R.	Jan. 11.	·078	·343	21·83	370·0
2	Lot 9, Con. 1, Gloucester, Ont.	J. O'C.	" 30.	16·57	·325	·28	3500·0
3	Pond near Toronto, Ont.	J. M	Feb. 2.	·27	·22	2·594	9·0
4	Melita, Man	A. E. E	" 4.	......	......	......	......
5	Archer, Ont.	J. F. C.	" 20.	·015	·058	·915	2·2
6	Norway, Ont.	S. H. J.	" 21.	12·83	·512	1·089	3·9
7	Glenella, Man.	W. J. F.	Mar. 5.	·05	·383	·0972	202·0
8	Gloucester, Ont.	J. O'C. No. A	" 9.	5·735	·203	·202	319·8
9	" "	" " B	" 9.	1·45	·107	None.	349·0
10	Shelbourne, Ont	R. A. R.	" 23.	·105	·073	·065	·1
11	Abbotsford, Que	Wm. C.	" 27.	Free.	·054	1·672	16·4
12	Orange Ridge, Man.	R. C.	" 29.	......	......	......	960·0
13	McKenzie, Man	W. W.	April 2.	·036	·266	·0099	·1
14	Beachburg, Ont	J. D.	" 6.	1·545	·75	·088	11·0
15	Pilot Mound, Man.	A. B. W.	" 23.	1·695	·197	None.	85·0
16	Millerton, N. B.	F. P. E.	May 23.	·01	·068	·527	4·0
17	Vankleek Hill, Ont.	H. D.	June 4.	·645	·10	·0288	10·0
18	Peachland, B. C.	R. H. H.	" 14.	·036	·021	·063	·4
19	Sweetsburg, Que.	R. D. W.	" 14.	·012	·054	1·06	None.
20	Pleasant Valley, Ont.	J. H.	" 22.	·012	·23	5·77	51·0
21	Bathurst, N. B	T. M. B.	" 25.	·032	·069	·023	320·0
22	Alexander, Man	T. S	July 3.	·016	·228	·392	560·0
23	Ottawa, Ont.	W. L. S	" 8.	·024	·205	·0856	1·2
24	Chatham, N. B.	J. N. No. 1	" 15.	·048	·03	·0329	650·0
25	" "	" 2	" 15.	·008	·02	·023	660·0
26	" "	" 3	" 15.	·022	·026	·0115	86·0
27	" "	" 4	" 15.	·024	·063	·0675	48·0
28	Pictou, N. S.	W. M. D	" 15.	·172	·093	·0593	9700·0
29	Barrie, Ont.	W. A. R.	" 22.	·036	·11	2·157	12·8
30	Brampton, Ont.	W. F. J.	" 24.	·014	·088	2·608	84·0
31	Arnprior, Ont.	A. R.	" 24.	·012	·044	·507	None.
32	Ville Marie, Que.	F. D.	" 25.	·066	·143	4·40	13·8
33	Toronto, Ont.	S. H. J.	" 26.	18·12	·505	·885	26·8
34	Lavant Station, Ont.	Thos. L.	" 27.	·072	·548	8·149	240·0
35	Brome Corner, Que.	F. H. P.	" 27	·02	·04	·105	·8
36	Summerside, P. E. I.	L. B. H.	" 29	·012	·036	5·40	39·8
37	Niagara, Ont.	A. B.	Aug. 2	·31	·054	·278	420·0
38	Britannia on the Bay, Ont.	A. L.	" 10	·275	·208	·0304	10·8
39	St. Catharines, Ont.	F. B.	" 14.	7·625	·168	None	72·0
40	Newcastle, Ont.	Wm. R.	" 17.	·016	·119	15·14	94·5
41	Bideford, P. E. I	Wm. R.	" 22.	·016	·093	14·91	67·0
42	" "	J. R.	" 22.	·02	·038	10·57	82·0
43	Port Sydney, Ont	A. L. F. B. No. 1	" 29.	·128	·232	·813	8·0
44	" " "	" 2	" 29.	·12	·172	2·826	9·0
45	" " "	" 3	" 29.	·08	·236	·092	10·5
46	Knowlton, Que	Hon. S. F.	" 30.	None.	·106	None.	·7
47	Ripon, Que.	J. T. No. 1	Sept. 19.	·096	·168	·035	3·0
48	" "	" 2	" 19.	·626	·073	·017	920·0
49	Woodman's Point, Westfield, N. B	F. H. J. R.	" 26.	·076	·022	2·261	44·9
50	Rideauville, Ont.	D. M.	" 26.	·730	·318	None.	5·2
51	Bloomfield Station, N. B.	W. S. S. W.	Oct. 1.	None.	·024	None.	5·8
52	Chatham, N. B.	W. S. L.	" 1.	None.	·052	1·538	20·0
53	Rossland, B. C.	A. J. Mc.	" 9.	·102	·093	·056	3·0
54	Headingly, Man.	H. A. W.	" 25.	2·41	2·51	·0494	4110·0
55	Summerside, P. E. I.	P. P. Co. No. 1	Nov. 4.	·074	·112	3·562	25·0
56	" "	" 2	" 4.	·026	·05	6·55	52·9
57	" "	" 3	" 4.	Trace.	·02	2·314	13·4
58	" "	" 4	" 4.	None.	·09	4·653	27·0
59	" "	" 5	" 4.	·63	·62	4·208	26·1
60	" "	" 6	" 4.	None.	·046	4·809	37·5
61	Thornhill, Ont.	D. J. No. 1	" 9.	·06	·27	5·213	67·0
62	" "	" 2	" 9.	·185	·225	12·05	145·0
63	" "	" 3	" 9.	·555	·405	·0782	6·5
64	Orton "	E. L. C.	" 22.	·288	·156	1·795	1·9

SESSIONAL PAPER No. 16

WELL WATERS, 1901.

PARTS PER MILLION.

Total Solids at 105° C.	Solids after Ignition.	Loss on Ignition.	Phosphates.	Report.	Number.
2390·0	1995·2	394·8	H. traces	Contaminated and unwholesome	1
6135·6	5594·8	540·8	V. H. traces	Very suspicious—Strongly saline	2
299·6	191·6	108·0	H. traces	Probably contaminated	3
5533·0	5269·0	264·0	H. traces	Saline water	4
313·2	254·4	58·8	None	Free from all organic pollution	5
341·2	198·8	142·4	H. ppt	Polluted and dangerous to health	6
7101·0	5708·0	1393·0	None	Saline water	7
5524·0	5288·8	235·2	Traces	Strongly saline	8
1257·0	1133·0	124·0	Traces	Saline water	9
252·0	152·8	99·2	V. Sl. traces	Probably free from contamination	10
324·0	244·0	80·0	Traces	Suspicious	11
6276·0	5880·0	396·0	Traces	Strongly saline	12
411·2	145·6	265·6	V. H. traces	Not polluted	13
460·0	258·4	201·6	H. ppt	Seriously contaminated	14
3000·0	2635·0	365·0	None	Saline water	15
50·5	29·0	21·5	Traces	Free from all injurious contamination	16
302·0	215·0	87·0	H. traces	Suspicious	17
87·5	58·0	29·5	Traces	Pure and wholesome	18
102·0	69·5	32·5	Traces	Safe and wholesome	19
388·0	250·0	138·0	Sl. traces	Seriously polluted	20
686·5	567·5	119·0	None	Free from organic impurities	21
4900·0	3796·0	1104·0	Traces	Saline water	22
62·0	23·0	39·0	None	Pure and wholesome	23
1175·2	993·2	182·0	Traces	Free from organic impurity	24
1156·8	1006·4	150·4	Traces	" " "	25
231·2	199·2	32·0	Traces	" " "	26
182·4	116·4	66·0	V. Sl. traces	" " "	27
16744·0	16309·0	435·0	Sl. traces	Saline	28
240·8	154·4	86·4	Traces	Decidedly suspicious	29
890·0	676·0	214·0	V. Sl. traces	" "	30
388·0	96·8	291·2	V. Sl. traces	Free from organic pollution	31
134·4	50·4	84·0	None	Dangerously polluted	32
443·6	251·2	192·4	H. traces	Very seriously contaminated	33
1264·8	787·2	477·6	Traces	Contaminated and unwholesome	34
82·8	54·4	28·4	None	Free from organic pollution	35
358·4	222·4	136·0	H. traces	Seriously contaminated	36
1054·8	999·6	55·2	None	Of doubtful purity	37
208·8	148·0	60·8	Sl. traces	Contaminated	38
1094·4	....	....	H. ppt	Polluted with drainage	39
831·2	540·0	291·2	None	Seriously contaminated	40
529·0	252·0	277·0	Traces	Highly suspicious	41
463·0	251·0	212·0	V. Sl. traces	Seriously polluted	42
133·0	97·0	36·0	None	Highly suspicious	43
105·6	68·0	37·6	Traces	Seriously contaminated	44
84·5	53·5	31·0	None	Good and wholesome	45
128·0	82·0	46·0	Traces	Excellent	46
128·0	91·0	37·0	Traces	Pure and wholesome	47
1592·5	1517·5	75·0	H. traces	Saline water	48
287·0	198·0	89·0	Sl. traces	Very suspicious	48
236·0	146·0	90·0	Traces	" "	59
167·0	122·0	45·0	Traces	Pure and wholesome	50
80·8	60·8	20·0	Sl. traces	Not contaminated	51
243·2	164·0	79·2	V. H. traces	Probably polluted	52
10319·6	9005·6	1314·0	None	Saline water	53
218·4	172·0	46·4	None	Suspicious	54
386·4	312·0	74·4	None	"	55
159·2	125·6	33·6	V. H. traces	"	56
264·0	213·6	50·4	Sl. traces	"	57
251·2	212·8	38·4	Traces	"	59
265·6	220·8	44·8	V. Sl. traces	"	60
472·8	392·8	80·0	V. H. traces	Seriously polluted	61
1222·4	942·4	280·0	V. Sl. traces	" "	62
347·2	268·8	78·4	Traces	Decidedly suspicious	63
198·8	139·2	59·6	Traces	Contaminated	64

From our own correspondence, and from the attention given in agricultural meetings and by the press, we are convinced that every year marks a more lively interest in this question of pure water upon the farm. There is no doubt that the number of farmers placing the base or source of their supply at a safe distance from possible pollution is steadily on the increase.

Nevertheless, there are still many who exhibit a complete apathy on this vital question, and it is to these we would appeal. If there are reasons to suspect the water —indications of contamination in smell or appearance—they should not be disregarded. It is quite possible that the well is receiving pernicious drainage from barn-yard, stable or privy. Neglect in this matter may mean jeopardizing the health of the farmer and his family, not to speak of troubles of various kinds in the dairy and cheese factory.

A number of the waters received from Manitoba and the North-west Territories, as well as from certain districts in other provinces, have been shown to be strongly saline. In the report of this Division for 1893, the results of certain experiments towards the improvement of saline waters are recorded. It is there shown that when the chief saline constituent is Epsom salts (magnesium sulphate) purification to a large extent may be effected by the judicious use of lime-water. For the preparation of a potable water from those containing sulphate and chloride of sodium (Glauber's salt and common salt) it will be necessary to have recourse to distillation, no method of filtration or precipitation for such waters being practicable. There are now upon the market several small stills that can be used on the kitchen stove and require but little attention. We cannot speak from personal experience of these household stills, but there is no apparent reason why they should not prove effective, yielding at but little, if any, extra expense a sufficiency of good palatable drinking water for the household.

REPORT

OF THE

ENTOMOLOGIST AND BOTANIST.

(James Fletcher, LL.D., F.R.S.C., F.L.S.)

1901.

Ottawa, December 1, 1901.

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to hand you, herewith, a report on some of the more important subjects which have received attention in the Division of Entomology and Botany during the year 1901. Many other subjects which have taken up some of the time of my assistants and myself need not be treated of specially in this annual report. The large numbers of applications for information and assistance made to the officers of the Division by agriculturists, horticulturists and others, continue to give encouraging evidence, not only of the usefulness of the investigations which are being carried on year by year, but also of the increasing appreciation of this work by the public in all parts of the Dominion. Of necessity a large proportion of the correspondence relates to the common, and therefore the more important, crop pests, concerning which serviceable advice can be given promptly. In this way much loss in many crops has been avoided.

Correspondence.—The large correspondence of the Division has been of a very varied character. From November 30, 1900, to November 30, 1901, the number of letters, exclusive of circulars, registered as received, is 3,058, and the number despatched 2,840.

Meetings Attended.—Meetings of farmers, dairymen, fruit-growers, &c., have been attended whenever other official duties would allow of my absence from Ottawa. Addresses were delivered at the following places :—

January 21-22, Kingston, Ont.—A meeting at Queen's University to discuss the importance of Forestry to Canada. Addresses were also given by the Hon. R. Harcourt, Minister of Education for Ontario ; Prof. B. E. Fernow, of Cornell University, and others.

January 31, Huntingdon, Que.—Pomological and Fruit Growing Association of the province of Quebec : 1. Injurious insects. 2. Can bees injure fruit ?

February 12, Toronto.—Toronto Horticultural Society : Insect Enemies of the Garden. Toronto Normal School : Nature Study.

March 19, Ottawa.—Select Standing Committee on Agriculture.

April 2, Ottawa.—Ottawa Normal School : Nature Study.

April 18, Smith's Falls, Ont.—Horticultural Society : Injurious Insects. Smith's Falls Public School : Nature Study. Smith's Falls High School : Nature Study in Education.

February 19, Perth, Ont.—Perth Public Schools : The Value of Nature Study and the Pleasures of Horticulture. Perth Horticultural Society : The Importance of Nature Study and Science in Horticulture.

June 6, Vars, Ont.—Public schools and farmers of the district : Nature Study and Science in Farming.

July and August.—Farmers' meetings in the West.

September 13, Buffalo, N.Y.—National Bee-keepers' Association and American Pomological Society : Address on Bees as Fertilizers of Flowers.

October 25, Gypsum, Ohio.—Special meeting of farmers : The San José Scale and the way to fight it.

November 13, London, Ont.—The Entomological Society of Ontario : 1. The Ohio and Ontario Experiments against the San José Scale. 2. The Value of Nature Study in Education. 3. Injurious Insects of 1901.

November 15, Toronto.—Toronto Branch of the Entomological Society of Ontario: The San José Scale in Ontario.

Fodder plants.—The experiments with grasses of all kinds and fodder plants have been continued upon the Central Experimental Farm, and, as in the past, have been a source of much interest to visitors. The summer of 1901 was exceptionally favourable for the growth of all grasses, and the varieties under cultivation succeeded well and made the Experimental Grass Plots a most attractive feature of the farm. In addition to the small plots of one square rod each, larger plots of the more desirable varieties were grown. The Awnless Brome Grass, introduced into Canada by the Experimental Farms in 1887, justly continues to increase in popularity ; it has proved a lucrative crop for seed growers and provides stockmen of the West with a prolific source of grass and hay. McIvor's Rye-grass, or Western Rye-grass (*Agropyrum tenerum,* Vasey), a native of the prairie regions, is also a most valuable grass, and is now much cultivated for its rich and heavy crops of hay and seed. Many packets of seed of these two grasses have been distributed to farmers and have given great satisfaction.

Reclaiming Sand Hills.—As was mentioned in my report for 1898, experiments are being carried on at the request of Dr. T. Christie, M.P., near Lachute, Que., in reclaiming a large tract of shifting sand now nearly 1,000 acres in extent. Among the plants used for this purpose, the White Spruce, Norway Spruce, Balsam Fir, White Pine, willows, Awnless Brome Grass and Quack Grass have been tried. The work as yet has been on too small a scale for marked results. A visit was paid on November 5 to the locality with you and Dr. Christie and an examination made of the area invaded by sand. After the past moist summer many of the trees which have been planted were found to have thrived satisfactorily, but the grasses had not done so well. Judging from the success of these trees, it is sincerely to be hoped that experiments on a more extensive scale may be carried out at an early date. The farmers living on the margin of this area of sand have shown much interest in the reclaiming of the land, have planted trees at considerable individual expense, and have taken good care of such trees as they were provided with.

Collections.—The collections of insects and plants in the Division have been very materially increased during the past year, and great progress has been made in building up a serviceable working collection. Many specimens in all orders of insects have been mounted and placed in the cabinets. Mr. Arthur Gibson, my second assistant, has done much of this work of arrangement and preparation of the specimens. Many larvæ of Lepidoptera and phytophagous Hymenoptera have been inflated and form a most interesting and valuable addition to the collections in those orders. A great many botanical specimens of Canadian plants have been mounted and deposited in the herbarium where they are now available for reference. This work is now being

pushed forward, and during the present winter I hope to have all the collections rendered much more complete than has been heretofore possible. The herbarium is in charge of the Assistant Entomologist and Botanist, Mr. J. A. Guignard. The Division is indebted to several correspondents for valuable donations of specimens. Every specimen in the collection is labelled with the name of the collector, the date when collected and the locality. Large collections of rare specimens have been generously given by the following :—

Rev. G. W. Taylor, Wellington, B.C.—Vancouver Island Lepidoptera and Coleoptera.

Mr. J. W. Cockle, Kaslo, B.C.—Many specimens of moths, butterflies and a few specimens of other orders, taken at Kaslo, on Kootenay lake, also the eggs of Lepidoptera for rearing.

Mr. W. C. Sandercock, Lauder, Man.—Manitoban insects.

Mr. A. J. Dennis, Beulah, Man.—Manitoban moths.

Mr. T. N. Willing, Regina, Assa.—North-west insects of several orders from Assiniboia and Alberta.

Mr. W. McIntosh, St. John, N.B.—Moths and butterflies from St. John.

Mr. F. H. Wolley-Dod, Calgary, Alta.—Some rare butterflies from Alberta.

Mr. N. Criddle, Aweme, Man.—Botanical specimens and paintings of Manitoban plants and insects.

Mr. J. M. Macoun, Ottawa.—A collection of Canadian violets.

Mr. J. R. Anderson, Victoria, B.C.—Many rare British Columbian plants not previously represented in the herbarium.

Mr. John Tolmie, Victoria, B.C.—Rare British Columbian plants.

Mr. Beverley McLaughlin, White Horse, Y.T.—A small collection of rare and well prepared plants from Yukon Territory.

Miss E. Blackman, Kaslo, B.C.—Rare plants from Kaslo, including one species, *Hemieva violacea,* never previously collected in Canada.

Mr. W. Herriott, Galt, Ont.—Specimens of Canadian grasses, many of them not previously represented in the collections.

Mr. Percy J. Shaw, Berwick, N.S.—A collection of Nova Scotia weeds made in Pictou county.

Mr. Henry Bird, Rye, N.Y.—Living caterpillars of *Hydrœcia* moths sent for study.

During the year 1901, as heretofore, many entomologists and botanists in various parts of the Dominion have availed themselves of the services of the officers of the Division in identifying specimens of insects and plants. A large number of collections have been received for this purpose and by means of this work much valuable information as to the distribution of native insects, plants, and weeds of cultivated lands, has been recorded and many desirable specimens have been acquired for the museum.

Acknowledgments.—My thanks are gratefully tendered to the following for frequent and valuable assistance in the identification of specimens : Prof. John Macoun and Mr. W. H. Harrington, Ottawa ; Mr. E. M. Walker, Toronto ; Prof. J. B. Smith, New Brunswick, N.J. ; Dr. Howard and his able assistants, in the United States Division of Entomology ; Mr. W. H. Ashmead, Dr. H. G. Dyar, of the United States National Museum ; Messrs. B. T. Galloway, A. F. Woods and F. H. Chestnut, of Washington, D.C. ; Prof. F. M. Webster, of Wooster, Ohio ; Prof. L. R. Jones, of Burlington, Vermont ; and Mr. G. B. King, of Lawrence, Mass., all of whom are

eminent specialists in certain lines of study. I am also under obligation to my many correspondents who have notified me of outbreaks of injurious insects and assisted in carrying out experiments for controlling the same. Recognizing the great value of this assistance, I endeavour to give proper credit where it is due, when circumstances demand that the various subjects should be treated of at length in the annual reports. All records of observations in letters from correspondents are carefully preserved and made use of, either when received or at some future time. Every exact observation is of scientific value, and frequently small facts apparently of little importance at the time, provide missing links of great importance in working out the life histories of injurious insects and devising remedies for their control.

In conclusion, I have much pleasure in testifying to the assiduity and excellence of the work performed by my assistants, Mr. J. A. Guignard, B.A., and Mr. Arthur Gibson, in office hours or afterwards whenever required.

I have the honour to be, sir,
Your obedient servant,

JAMES FLETCHER,
Entomologist and Botanist.

Central Experimental Farm, Ottawa.

1. Plot of Awnless Brome Grass, Second Year (In centre of plate). 2. Part of Experimental Grass Garden.

NOTES ON LECTURING TOURS AND INVESTIGATIONS

IN MANITOBA, THE NORTH-WEST TERRITORIES AND BRITISH COLUMBIA IN 1901.

By instruction of the Honourable the Minister of Agriculture, and at the request of the several governments of Manitoba, the North-west Territories and British Columbia, I spent the months of July and August last in the West. In Manitoba the chief subject studied was locust injuries. In the North-west Territories a series of farmers meetings was held in northern Alberta in continuation of work of a similar nature which I have taken part in during the last three summers. The special subject for discussion was Noxious Weeds and their Eradication. In this work particular attention has been drawn to the great value of using light harrows and weeders on growing grain crops after they have appeared above the ground, also the value of Nature Study in Agricultural Education. In British Columbia insects injurious to field crops and fruits were dealt with as well as weeds, hay and fodder crops in general, and Nature Study.

MANITOBA.

Leaving Winnipeg on the first of July in company with Mr. Hugh MacKellar, the Deputy Minister of Agriculture of Manitoba, and the Rev. W. A. Burman, I visited certain districts where serious inroads were being made into the crops by grasshoppers. A report on this investigation made to the Hon. R. P. Roblin, Minister of Agriculture for Manitoba, in which the main features of importance are dealt with, appears further on in this report. (See page 222.)

THE NORTH-WEST TERRITORIES.

After finishing the work in Manitoba, I proceeded westward. A most pleasant and profitable day was spent at the Experimental Farm at Indian Head, examining the crops and making other observations connected with my work. The exuberant appearance of all vegetation throughout the West this year surpassed by far anything which had ever been seen before since the settlement of the country, and the magnificent crop which has just been reaped confirms the hopes which were entertained by all classes at the time of my visit. July 10 was spent at Regina with Mr. T. N. Willing, the Territorial Weed Inspector for the North-west Territories, and an interesting drive was taken through the country surrounding the North-west capital, during which notes were taken as to the degree of prevalence of noxious weeds. The good work which has been done by the North-west Government in this connection, was very perceptible.

On the evening of July 10, I left Regina and reached Pense, where I visited Gatesgarth, the home of Messrs. Gerald and Bernard Spring-Rice. This is now a most interesting place, where successful experiments have been carried on for some years in advanced farming and tree-planting. The following day was taken up in examining the groves of trees, plantations of shrubs, fields of Brome Grass and other crops. The greatly enhanced beauty of this place, due to the enthusiasm and skill of the brothers Spring-Rice, the improvements and advanced methods practised, have for several years been an object lesson to the farmers of the district. My kind hosts spared no pains to make my visit profitable and enjoyable. On the evening of July 12, I reached Calgary and joined Mr. Angus Mackay. Leaving Calgary early on the

morning of July 13 with Mr. F. H. Wolley-Dod, I drove out with him to his stock farm 20 miles southward of Calgary, thus obtaining a good opportunity of seeing the crops and the country in this very attractive part of the Territories. On the morning of July 14, Col. Herchmer drove me out to see his farm on the Bow River, close to Calgary, a charming location where he has made many improvements. In the afternoon the Dominion Dairy Station and Cold Storage houses were visited with the Chief Superintendent, Mr. Christian Maerker ; afterwards we went to see Mr. Wm. Pearce and were shown his experiments in growing trees, which he has been carrying on for several years with considerable success. On the morning of July 15, I left Calgary in company with Mr. Angus Mackay and Mr. George Batho, of the Nor'-west Farmer staff, by the Edmonton branch of the Canadian Pacific Railway to hold farmers' meetings along that railway. These meetings, for which arrangements had been made by the Department of Agriculture for the North-west Territories, were held at various places during the following two weeks, and the chief subject treated of by the speakers was the Eradication of Noxious Weeds. At all of these meetings the procedure followed was for Mr. Mackay to deliver the first address, in which he dealt with the chief features of the Experimental Farm work, which would be of interest in the locality, such as the experiments in eradicating weeds on dirty lands, the value of summer-fallowing for various purposes, the cultivation of grasses, the growth of trees and fruits, and the distributions made of trees and seed grain. He also pointed out the many ways in which the farmers of the North-west Territories could avail themselves of the benefits to be derived from the Experimental Farms, and assured them that he would always be pleased to assist them in every way in his power. Mr. Mackay's great knowledge of all branches of farming and his reputation as a reliable source of information on these matters proved a great attraction to the farmers in all the places where meetings were held. My own addresses were intended to explain concisely the nature of weeds in general, the losses due to their presence in crops, and the methods which had been found successful in combating them in various places with similar conditions of soil and climate. Particular attention was paid to those plants which were found to be prevalent in the different localities. Freshly gathered specimens were always collected before the addresses were delivered, which were found most useful in showing exactly what plants were being discussed. Large numbers of specimens were brought to the meetings by farmers wishing for information upon special weeds which they had seen or had found troublesome on their own farms. A few specimens were also taken with us of some of the worst weed enemies, such as Stink Weed, Larkspur, Sweet Grass, Wild Oats, &c., in case these might not yet have been introduced into the various districts, but of which it was most advisable that farmers should know the appearance and nature, so as to guard against them and attend to their destruction promptly, should they by chance be introduced. Mr. Batho placed us under a debt of gratitude by his kindness in collecting specimens and in creating an interest in the meetings in many other ways. The success of several of the meetings was also much enhanced by the presence and energetic help of Mr. T. N. Willing, of Regina, and of Mr. Percy B. Gregson, of Waghorn, Alta., the local Weed Inspector, who had taken great pains to make it known when and where these meetings were to be held.

Olds, July 15.—An excellent meeting, the first of the series, was held at this thriving little town, which is the centre of a rich agricultural district, settled largely by Americans from Nebraska and Germans from Ontario. Mr. Henry Briggs was in the chair, and gave an admirable address on experiments he had been carrying on in growing fall wheat and fodder plants. Awnless Brome Grass he had cultivated for seven years, and he had always found it most satisfactory in every way. White Clover had done well, and Alfalfa was promising. Fall wheat sown early on newly broken ground had succeeded best, but, when this grain was sown on well worked land, the crops were heavier, although they ripened later.

Innisfail, July 16.—Mr. F. M. Oldham in the chair. A well attended meeting. Awnless Brome Grass was a subject much discussed. Mr. Mackay referred to the fact that this grass was not so highly esteemed at Calgary and Pincher Creek as at other places in the Territories. He had found it excellent in every way at Indian Head and considered the hay the best he had grown for horses. The seed could be sown at any time, but he preferred sowing directly after seeding spring grain without a nurse-crop, as there is not enough soil-moisture at Indian Head to support both crops to the best advantage. He attributed some of the failures in the Calgary district to too heavy seeding ; 8 or 10 lbs. of seed per acre was the proper quantity to sow. There was no difficulty in eradicating Brome Grass if the work was done properly. The sod should be broken 2 or 2½ inches deep during hot weather in June and back-set in August. To prevent the blowing away of surface soil, which was a trouble in some parts of the North-west, Brome Grass and Western Rye-grass were of great value. In his experiments he had found that wheat did best on Western Rye-grass sod, and oats and barley on Brome sod. One crop of Brome Grass would provide fibre in the soil for three or four crops of wheat or other grain. An animated discussion was held on the weed question, and Mr. Mackay paid a high tribute to the good farming of Mr. Henry Briggs, whose farm he had visited the previous day and had found to be one of the cleanest farms he had seen in the Territories ; this farm showed what could be done by good work. A large collection of weeds was examined and the characters of each were explained. The value of summer-fallowing for the purpose of clearing land of weeds was pointed out. This should be done early and followed by not more than three or four cultivations so as to allow seedlings time to germinate. It was quite possible to cultivate land so frequently in hot weather that the germination of seeds could not take place, and the land would be left almost as dirty as when the work was begun.

Mr. Gregson compared the condition of farms in the Innisfail district this year and last. He also showed examples of Stink Weed and Canada Thistle collected in the locality and warned farmers against allowing these troublesome pests to spread.

Red Deer, July 17—Mr. A. Cole in the chair. The meeting was small, owing to another important meeting on school matters being held at the same time. Among weeds brought to the meeting by Mr. Gregson were samples of Canada Thistle, four feet high ; Stink Weed, two feet ; Shepherd's Purse, 18 inches ; Larkspur, five feet ; Wormseed Mustard, three feet, and Gray Tansy Mustard, four feet. Red Deer is an older settled district than some others in northern Alberta ; the settlers from Innisfail and Red Deer to Lacombe are chiefly from Ontario.

Strathcona.—This thriving town, formerly known as South Edmonton, was reached on the evening of July 18, which was marked by an unusual phenomenon for the locality, a furious hail storm, which, together with two preceding storms at recent date, had worked great havoc on the crops and all other vegetation. A meeting was held at 2 o'c., of 19th, Mr. McLean in the chair. Mr. McIntyre, the secretary, had worked up the meeting well, but other interests prevented a very large attendance. Mr. Mackay spoke of summer-fallowing, and much interest was evinced in weeds. Farmers were warned against Ball Mustard (*Neslia paniculata*, Desv.), which was the most prevalent weed noticed in grain fields from Calgary to this point. Mr. T. N. Willing spoke of the necessity of farmers in the Edmonton district taking more pains to clear weeds from their crops, particularly from oats. Mr. George Batho exhibited samples of Russian Pig-weed (*Axyris amarantoides*, L.), which was spreading rapidly through the Territories, particularly along lines of railway. It is a bad weed of vigorous growth, with hard wiry stems, which are difficult to cut. In the winter it becomes a tumble weed.

Clover Bar, July 20.—Mr. Daly in the chair. Leaving Strathcona at 10 o'clock, we drove over roads, bad, owing to late rains, to Clover Bar, a very thriving district

where a good meeting was held. The farmers were very hopeful, regarding the recent hail storms as quite exceptional occurrences not likely to happen again. Ball Mustard and annual weeds were much discussed. Mr. Mackay recommended that early summer-fallowing should be practised in connection with mixed farming. Plough deeply, 7 or 8 inches, if possible, before June 1, and at any rate before July 1. Harrow at once and cultivate three or four times, not more. Sow oats or barley for feed the first year, and cultivate, but do not plough again. In the second year sow Red Fife wheat, seeding two weeks after spring opens. If oats are sown, plough once, and sow two weeks later than wheat. Brome and other grasses may also be used as cleaning crops.

Fort Saskatchewan, July 20.—Leaving Clover Bar at 4.30, we drove to the old settlement of Fort Saskatchewan, where a most successful meeting was held the same evening. It was pointed out that many weeds were by far too noticeable in the crops seen along the road. The most noxious of these were shown, and methods for their control were given. Both here and at Clover Bar much inquiry was made about Sweet Grass (*Hierochloa borealis,* L.). The chief cause of its persistence was found to be that settlers had been calling it by the wrong name, viz., 'Twitch grass,' and treating it accordingly. 'Twitch Grass,' or 'Scutch Grass,' is a shallow-rooted perennial requiring shallow ploughing, whereas Sweet Grass roots deeply and requires as deep ploughing as possible, the very opposite treatment to that which it had generally received. In both cases, the land should subsequently be put under a smother crop, such as a thick seeding of oats or barley to be cut for feed as soon as ready. The best time to cut oats for hay is when they are in blossom.

Mr. Mackay again pointed out the value of summer-fallowing as a weed clearing process and advised the practice at least once in three years. Leaving Fort Saskatchewan early on the morning of July 21, we drove in to Edmonton and spent the day there.

Leduc, July 22.—This is a new settlement, peopled for the most part by Americans, Russian Germans and Canadians from Ontario. It rained nearly all day, and, owing to the state of the roads, few farmers could come in to the meeting. An informal meeting was held in the Leland hotel, a nice clean house, kept by Mr. Willis. The afternoon was spent making botanical collections, several interesting specimens being secured.

Wetaskiwin, July 23.—Mr. J. McVicar in the chair. This is a new place, settled mainly by Swedes, Germans and Americans. An enthusiastic meeting was held in the afternoon with a prolonged discussion on summer-fallowing, the best time to sow, and the quantity of seed grain to the acre. Awnless Brome Grass was recommended. Speaking of the value of this hay, Mr. Mackay stated that he had obtained as good results in feeding the straw of this grass, from which the seed had been threshed, as from any other hay. Some difficulty having been experienced in knowing the proper time to cut Brome for seed, it was explained that this should be done when the seed was of about the same consistency as wax. At Indian Head, Brome Grass flowered about July 1, when the fields presented a golden yellow appearance from the copious pollen-bearing anthers ; three weeks later than this the seed would be ripe enough to cut and the fields would be of a purplish hue. Cutting should not be delayed too long or much seed would be lost. When the seeds on a few heads would shell out, the crop should be cut. An acre of Brome Grass would give from 400 to 800 pounds of seed and an average of 2½ tons of hay. The crop would depend largely on getting good rains in May. Well cleaned Brome seed would always fetch at the lowest figure 10 cents per pound. Four crops of Brome Grass could be taken from one seeding, but the best management was to take two crops of hay and then use the field as pasture for two years.

Ponoka, July 24.—Mr. Alger in the chair. A large meeting was held here. Ponoka is beautifully situated on the banks of the Battle river with rich rolling land around it, which has been settled by progressive Canadians from the East and Americans. Much interest was taken in the subjects treated of by the speakers. Summer-fallowing early was highly recommended by Mr. Mackay for cleaning land of weeds. It had been noticed that very few of the summer-fallows to the north of this place had been ploughed at the present time, and yet the seeds of many weeds, such as Shepherd's Purse, False-flax, Pepper grass, Stink Weed, where it occurred, and some others were already ripe. It was claimed that summer-fallowing, as advised, in these rich moist lands, would make the crops late and give too much straw. Mr. Mackay advised heavier seeding, viz., 2 bushels of wheat, and 2½ bushels of oats ; this was more seed than was used at Indian Head, where they found that 1½ bushels of wheat and 2 bushels of oats to the acre gave the best results. Great stress was laid on the importance of sowing clean seed as a means of reducing weed presence; Mr. Mackay believed that the success he had secured at Indian Head in keeping their land free of weeds was very largely due to the care taken in cleaning seed grain. Summer-fallowing however, he considered essential if the rich lands of the West were to be kept free of weeds. Lateness of the crop grown on such land and too luxuriant a production of straw might be prevented by the following method. Fallow by ploughing deeply as soon after seeding time as possible, harrow to start the weeds. Three weeks will give the weed seeds near the surface a chance to germinate ; cultivate these 2½ inches deep and repeat the operation 3 times. This will destroy four crops of weeds. Next spring harrow early, leave the land till the 1st of June, then sow a grain crop to be cut for green feed in the first week in August. After cutting this, plough 2½ or 3 inches deep and sow wheat the next spring. If the land is still thought to be too weedy, two crops of grain feed may be taken. If the land is not very weedy drill in wheat 2½ inches deep without cultivation, and, when it is one or two inches high, run over it with a weeder or light harrow. Brome Grass and Western Rye-grass were discussed, and the proper seeding of each of these was stated to be 10 pounds to the acre. Western Rye-grass provides excellent pasture and hay, but the latter must be cut when in bloom ; the straw from which ripe seed has been threshed, is almost useless. The difference between Awnless Brome (*Bromus inermis,* L.) and the native Western Brome (*Bromus Pumpellianus,* Scrib), was explained to be that, of the former, the stems and leaves are perfectly smooth and the chaff scales bear no spike-like awns, while in the native species, which is also a luxuriant and very valuable grass, the leaves and stems, particularly at the joints, are always more or less hairy and the chaff bears a short sharp awn.

Earnest inquiries were made as to whether plums and apples would be likely to succeed in the district, and mention was made of the successful experiments which have been carried out at the Experimental Farms in selecting desirable forms of the native plum and in improving the hardy Siberian crab apple (*Pyrus baccata,* L.) by crossing it with the best varieties of hardy apples. Some fall wheat which would have been ripe in about two weeks, was shown at this meeting, and Mr. George Batho spoke of the success in growing this grain in the district.

Lacombe, July 25.—Mr. F. B. Watson in the chair. A splendid meeting was held at this thriving and active town. The meeting had been well worked up by Mr. Percy Gregson, and the farmers brought in a large number of specimens of weeds and other plants concerning which they desired information. Col. J. J. Gregory contributed many plants of interest and took a leading part in the discussions, bringing forward many subjects which he knew to be of special interest in the locality. After the meeting broke up, it was carried on informally for nearly another hour by those present who wished to make the most of the opportunity to discuss various farming matters with the speakers. Mr. Gregson spoke at length of the efforts being made by the Hon. G. H. V. Bulyea to help the farmers of the North-west in their fight against

noxious weeds and of the excellent work which had been done by Mr. T. N. Willing, the Territorial Weed Inspector. Specimens of Stink Weed, Canada Thistle, Ball Mustard, Wild Mustard, and Bird Rape (or Smooth Mustard) were exhibited.

During the evening a visit was paid to Mr. Howell's beautiful garden, where everything was growing in the greatest luxuriance.

On the morning of July 26, we drove out to see Col. Gregory's farm, and particularly a good patch of Alsike clover. Here we found many things of interest—a fine patch of Brome Grass, grown from a small sample of seed sent from Ottawa three years previously ; a field of spelt wheat, very fine turnips and a nice grove of native trees, spruce, aspen and birch, which have grown remarkably well in the seven years since they were planted, also two kinds of native currants (*Ribes Hudsonianum*, Rich., and *Ribes floridum*, L'Hér.).

Leaving Lacombe at noon, we reached Calgary at 7 p.m., and I left the same night for British Columbia to examine some of the districts which were last year devastated by the Variegated Cutworm, and to hold meetings with Mr. J. R. Anderson at several places where Farmers' Institutes had been formed.

British Columbia.

I reached Revelstoke at 2.30 p.m., July 27, and Nelson at 7.30 on 28th idem. A night and part of the following day were spent at this picturesquely situated little town on the shore of Kootenay Lake, and at 4 o'clock in the afternoon I took the steamer *Kokanee* for Kaslo, which place I reached in the evening. I was met there by Mr. J. W. Cockle, an enthusiastic naturalist, who has been of great assistance to me by collecting insects and plants and by sending information concerning injurious insects. Before dark, I was able to call and see Mr. George Alexander, a great lover of flowers, and to go over his most beautiful flower garden. I had heard previously of Mr. Alexander's success in floriculture, but was little prepared for the blaze of colour and the large number of choice plants which were to be seen in his grounds. After passing the night with Mr. Cockle, and examining his extensive collection of insects, he kindly took me to visit several gardens in the upper town, where heavy crops of all kinds of fruit were seen. While at Kaslo, I had the pleasure of meeting Miss Ethel Blackman, a botanist, who has contributed many rare and highly valued specimens of plants to the herbarium of the Division. I left Kaslo at 10 o'clock, July 30, and took the train to Sandon. The scenery up this railway to Sandon and down again to Nakusp on the Arrow Lakes, is extremely grand. After a delightful trip by boat up the Arrow Lakes to Arrowhead, the train was again taken and the night passed at Revelstoke. Vancouver was reached during the night of July 31, and I proceeded the next day to Nanaimo.

A series of meetings of Farmers' Institutes was held during the month of August at various places on Vancouver Island, in the Fraser valley, the Nicola valley, and in the Okanagan valley. These meetings were arranged and all were attended by Mr. J. R. Anderson, the active Deputy Minister of Agriculture for British Columbia, who also ably fills the difficult post of Superintendent of Farmers' Institutes for the whole province. The Farmers' Institute is a much newer development in British Columbia than in the older provinces, and many districts have not yet organized themselves into institutes. Where, however, organization has been effected, the members appreciate very fully the advantages to be derived from the system. Farmers come to the meetings knowing what they want, and are prepared to put their views plainly before the meeting and get the opinion of others upon subjects of general interest. The province has a most useful and painstaking officer in the Deputy Minister, who makes a point of attending officially all meetings whenever possible, and the farmers in that way have frequent opportunities of bringing their wishes directly before an executive officer of the Government. The Central Farmers' Institute is firmly established, and the annual meeting is well attended by delegates from all parts of the

province. This meeting is held in the autumn. Ever since the establishment of the institutes, special speakers have been provided by the provincial Government to address the meetings upon agricultural subjects at each place at least once or twice a year. In this way, the farmers of the Pacific province have had an opportunity of hearing some of the best institute workers of the East. Among others, series of several meetings have been held during the last four years, by Messrs. Shutt, Gilbert, Robertson, Hodson, Stewart, Maerker, Ruddick, Drummond, Raynor, &c.

Comox, August 2.—The first meeting was held at Courtney, near that place. There are few spots better suited to dairying than this. Most luxuriant crops of hay and other fodders are grown, and the pastures are excellent. A butter factory has been lately established, and is doing well. Fruit is also grown to advantage.

The meeting was well attended and an animated discussion took place. After the meeting we drove to Union Mines. The following day was spent in the Beaufort range of mountains, collecting botanical and entomological specimens. Mr. Walter Anderson accompanied us on this trip and discovered a species of *Rubus* (*R. nivalis* of Howell's Flora), new to Canada. Leaving Union early August 4, a most delightful drive of 42 miles through the forest was taken to Parksville, where we were most hospitably welcomed and entertained by Mr. and Mrs. R. F. Hickey. Mrs. Hickey had collected several injurious insects, amongst which I found a few specimens of the Variegated Cutworm. We left Parksville on the morning of August 5, and drove 35 miles to Alberni, passing along the beautiful Cameron Lake and through the wonderful forest at the base of Mount Arrowsmith. We arrived at our destination at 5 o'clock.

Alberni has an active institute, and a good meeting was held at 8 o'clock the same evening. Great interest was evinced in the proposed action of the Department to assist farmers in the very heavy and expensive work of clearing away the stumps of the gigantic trees which are characteristic of that part of Vancouver Island. It was announced by Mr. Anderson that his Minister had made arrangements by which gunpowder of the most suitable kind would be provided at half the price they could get it themselves, if they would conform to certain conditions. There was an animated discussion on the weeds of hay lands and pastures. My own address was on the great importance of the new educational movement known as Nature Study, which I claimed must be of inestimable value to farmers ; in fact, I consider Nature Study is the common sense of education, whatever may be the chosen vocation of any schoolboy or girl, and this is more particularly true of farmers, for all their work has to deal directly with objects, a knowledge of which comes within the limits of natural history. Successful farmers are those who understand their business best. The farmer who knows how plants grow, feed, and develop, will best understand how to fight weeds, which crops are suitable for certain soils, the way to treat them, their requirements, and how they can be used to his own greatest advantage. A knowledge of zoology would be of great use to a farmer in caring for and breeding stock. With even an elementary knowledge of entomology, he could cope much better than the farmer of to-day with the many insect enemies which yearly destroy a large proportion of every crop. To illustrate this, I referred to Mr. Anderson's good work at the beginning of the cutworm outbreak last year, and showed that much loss had been avoided by his being able to advise promptly what should be done to check the caterpillars in their depredations.

The benefit of cultivating clovers and other nitrogen-gathering crops was explained, the best time to cut hay, and the advantage of a proper rotation of crops. Speaking of the great interest now being created in forestry by the new Canadian Forestry Association, I urged my hearers to do everything in their power to preserve the magnificent forest around Cameron Lake, within a few miles of Alberni, which I had driven through when coming to the meeting, and which I believe is one of the finest pieces of standing timber in the world. The very size of the trees, as up to the present there are no railways there, would protect it for many years if they could only keep

out the greatest enemy of all—fire. There were few places where trees of from five to eight feet in diameter could be seen, as was the case there, by thousands. Everyone could do something to create an interest in this subject, if not, indeed, on occasion, to prevent fire from spreading. They were reminded that a single spark was enough to start a disastrous conflagration.

Starting at 5 a.m. on August 6, the ascent of Mount Arrowsmith, the highest mountain in that part of Vancouver Island, was begun. This expedition to the summit of this mountain was of great interest, and large collections of rare botanical and entomological specimens were made, as well as notes taken on the trees and other indigenous plants observed. At a height of about 4,000 feet grand groves of the Yellow Cypress (*Cupressus Nutkaensis,* Hook.) were found. Perhaps the most interesting plants collected were *Allium Nevii,* Wat., a pretty dwarf pink-flowered onion, a blue-flowered caulescent violet and *Calandrinia Columbiana,* Howell, a beautiful plant of the Purslane family, with large fleshy roots and showy pink flowers. The descent of the mountain was made on the afternoon of August 8, and a long drive of 55 miles taken the next day to Nanaimo.

Nanaimo, August 9.—A good meeting was held in this town at 8 o'clock in the evening, where, although the attendance was small, much interest was taken in the subjects presented. The discussion was upon the best crops to grow upon certain soils and on agricultural methods suitable for Vancouver Island. Grasses for hay and pastures were also discussed, and the disappearance of the Variegated Cutworm was much commented upon. Nanaimo was almost the only place in the province where any injury was done by this caterpillar in 1901. Leaving Nanaimo by train the next morning, Victoria was reached at 12.30.

Saanich, August 10.—A largely attended meeting was held at this place. By request, the subject presented was Nature Study in education and as affecting agriculture. Nature Study had recently been added to the regular curriculum of the public schools of the province. Many of the audience, including the leading school teachers from Victoria and the district, went out to the meeting by special train provided for the purpose. There was also a large attendance of farmers who joined heartily in the discussions.

The next day was spent in Victoria, and I had the honour of being shown some interesting experiments in tree culture by His Honour the Lieutenant Governor Sir Henri Joly de Lotbinière in his grounds near Government House.

On August 12, in the morning, I visited Cloverdale, the residence of Mr. John Tolmie, and spent a few hours examining his botanical collections, and interesting plants, which he has growing in his grounds. The afternoon was spent in the small but exceedingly well arranged and instructive museum of the Department of Agriculture. The herbarium, representing the flora of the province, made almost wholly by Mr. Anderson himself, is very complete and several other collections illustrative of the natural wealth of the province are here presented in such a way as to strike the mind of a visitor at once with the capabilities of the country. Among other things may be mentioned that at one end of a room stands a single mounted leaf of the bracken nine feet high. Above this along the ceiling is a single annual shoot of a bramble 12 feet long, and by the side of these a one-year's growth of a young plum tree 8 feet long.

Leaving Victoria by steamer at midnight, we reached Vancouver at 9 o'clock on the morning of August 13. Here I was met by Mr. Tom Wilson, the Government Superintendent of Fumigation, and I went with him and inspected the fumigating house where all imported nursery stock is fumigated for the destruction of the San José Scale, and found everything in perfect order. We left Vancouver at 1 o'clock by the Canadian Pacific Railway, and, proceeding to Harrison, crossed by steam ferry to Chilliwack.

Chilliwack, August 13.—The farmers of this fertile district always turn out in large numbers, and the last meeting was no exception. Insects injurious to fruit

crops were dealt with, and particular reference was made to the disastrous outbreak of the Variegated Cutworm in 1900. The farmers of the whole province are to be congratulated on the activity of the Department of Agriculture, and the prompt manner in which the best-known remedy, the bran and Paris green mash, had been brought before the country through the public press by the Deputy Minister. A tribute was paid to the agricultural and daily press for the way in which they always published at once any matter likely to be helpful to farmers, recognizing that anything which affected the prosperity of the farmer affected that of the whole community.

On August 14, we started on a collecting trip up Mount Ché-am. Driving 12 miles to Popcum, we called on Mr. Eb. Knight, who helped us very much in getting suitable guides, and by 9 o'clock we started on the ascent of this interesting mountain, which, rising from the level of the river 30 feet above sea level, runs up to a height of about 8,000 feet, and presents exceptional advantages for examining the fauna and flora of the various altitudes. The weather was magnificent, and large collections were made during the ascent. By 6.30 an extensive plateau at about 7,000 feet was reached, and camp was made for the night. This plateau is an undulating meadow stretching from where we came on to it for about a mile to a deep valley out of which Angel Peak or Mount Ché-am proper rises to the north, and Lady Mountain, flanked by Deer Ridge, to the south. This mountain meadow is one extended garden of exquisite beauty with the greatest variety of mountain flowers. Covering almost the whole surface of this elevated upland are dwarf bushes of the Mountain Blueberry (*Vaccinium Myrtillus*), not more than a few inches high in many places, but crowded with pink bells ; here and there are large beds of crimson, green, and white Mountain Heather (*Bryanthus empetriformis, B. glanduliflorus* and *Cassiope Mertensiana*), of Purple Lupins (*Lupinus Nootkatensis*), Golden Groundsels (*Senecio aureus* and *S. canus*), Arnicas (*A. latifolia*, and *A. cordifolia*), white-flowered Valerians (*Valeriana Sitchensis*). There again tall wand-like spikes of *Veratrum viride* with handsome broad leaves and green flowers, standing up in a sea of waving grasses and sedges, dotted with the bright starry flowers of Mountain Fleabane (*Erigeron salsuginosus*), their delicate purplish flowers contrasting beautifully with dwarf Goldenrods (*Solidago multiradiata*, var. *scopulorum*), Potentillas (*P. fruticosa*), White-flowered *Spiræa pectinata* and blue-tinged Pentstemons (*P. confertus*, var. *cæruleo-purpureus*), with in some places the gorgeous scarlet tufts of a Castilleja and numberless golden-flowered Glacier-lilies (*Erythronium grandiflorum*). In low spots along streams of snow water, beds of bright yellow buttercups (*Ranunculus Eschscholtzii*), starry white flowers of *Caltha leptosepala* and the crimson spikes of the handsome mountain musk (*Mimulus Lewisii*) were seen. On flats wet with snow water, the delicate white flowers of *Claytonia sessilifolia* covered the ground in company with the bright yellow-flowered *Potentilla gelida*. In a boggy spot with a stream running through it were stiff tufts of mountain coltsfoot (*Petasites frigida*) and the delicate little *Mimulus luteus*, var. *alpinus*. with its hair-like stems and small leaves bearing very little resemblance to the typical species, pushed its large flowers above the icy cold saturated moss. On the upper slopes grew clumps of the silvery *Luina hypoleuca*, the delicate mountain Hare-bell (*Campanula rotundifolia*, var. *alpina*) with its large blue flowers, *Aplopappus Lyallii* with blossoms of a bright orange, and *Troximon aurantiacum* of a variety with purple flowers. Higher up towards the peak *Phlox Douglasii, Pentstemon Menziesii*, and *Silene acaulis* were abundant, and, highest of all, *Smelowskia calycina*. The trees and shrubs most abundant on the upper levels were gnarled and stunted trees of *Tsuga Pattoniana* and an *Abies* like *grandis*. Both of these trees, however, when in protected valleys, even up near the summit between Angel Mountain and Lady Mountain, grew to great size, several trees being over three feet in diameter. Among the most noticeable shrubs were *Pyrus sambucifolia* with pink-tinged flowers, *Rhododendron albiflorum* with its delicate green tinted white bells, *Ribes laxiflorum* and dwarf mountain willows, *Salix commutata*, with handsome foliage, and perfect fruiting bushes of the minute *Salix nivalis*,

not rising an inch above the surface of the ground. It was remarkable that not a single strawberry plant was found on this mountain, although they are plentiful on the Vancouver Island mountains. Insect life was equally abundant with the vegetation. This sea of flowers was visited by swarms of mountain butterflies, *Melitæa anicia*, Db.-Hew., *Argynnis chariclea*, Schneid., *Lycæna aquilo*, Bdv., and *L. anna*, Edw., with *Parnassius clodius*, Men., in the valleys. The most interesting species found on Mount Ché-am is *Erebia vidleri*, Elwes, a species discovered in British Columbia 30 years ago by Captain Vidler, but of which nothing was known as to locality and date of capture. No other locality as yet is known than this mountain where I rediscovered it in 1898, and took three specimens in August. This year I took 13 on August 15 and Messrs. Tom Wilson and A. Bush took as many more. Large collections were made of insects in various other orders, which were brought back safely to Ottawa. We descended the mountain on August 16, and left on the 17th for the upper country, reaching Kamloops early on the morning of the 18th. On the 19th we drove 62 miles down the Nicola valley to Nicola Lake. On the way grass on the ranges, trees in coulees and crops at several places were found to be considerably injured by grasshoppers, mainly a species much resembling the Rocky Mountain Locust (*Melanoplus spretus*), and identified by Mr. E. M. Walker as *M. affinis*.

Nicola Lake, August 19.—A good meeting was held at this pretty little town. Injurious insects, locusts, cutworms, and fruit pests were the subjects of the address, and also Nature Study and the Value of Farmers' Institutes. Leaving Nicola Lake early on the 20th, before the sun got too hot for comfortable driving, we took breakfast at Mr. O'Rourke's hotel, Quilchena, and reached Kamloops by 7 p.m. We left again at 3 a.m. by rail, reaching Sicamous by 6 o'clock on August 21 and Enderby by 9 o'clock. The day was spent in collecting and packing our specimens.

Enderby, August 21.—The first meeting in the rich Okanagan valley was held at this place and was an excellent meeting. Grain crops, Brome Grass, and Injurious Insects were fully discussed, and many inquiries were made concerning weeds. Wild Oats are very prevalent in this valley. After the meeting several farmers waited and an informal discussion, which brought out many useful points, was continued for another hour. Leaving Enderby at 9 o'clock on August 23, the next stop was made at Armstrong, where I had the pleasure of examining Mrs. Walton's collection of insects, and then Mr. Walton kindly drove me to Vernon.

Vernon, August 22.—A meeting was held in the town hall in the afternoon, which was well attended. Fruit, grain and fodder crops were discussed, as well as their insect enemies. Rattlesnakes, which are not uncommon in the locality, were also a subject of debate. It was thought that the virulence of the poison of the variety occurring in this valley was not as great as that of those farther to the south. The Awnless Brome Grass had not succeeded as well here as it had in some other parts of British Columbia and in the Prairie Provinces.

After the meeting a visit was paid to Lord Aberdeen's ranch at Coldstream, where the capabilities of this fertile district are plainly visible. Good management and horticultural skill have combined to make this a model of what a successful fruit farm can be in this district.

Leaving Vernon on the morning of the next day, we took the steamer *Aberdeen* to Kelowna, reaching that place by 3.30. The afternoon was spent in collecting along the shores of Lake Okanagan and in the woods.

Kelowna, August 23.—This was the old Okanagan Mission, but the enterprise and activity of the members of the Kelowna Shippers' Union have made a new place of it. Here fruit of the best quality is produced in larger quantities every year, and every boat that leaves the wharf carries a freight of delicious fruit to less favoured localities. The suitability of the soil to produce an excellent quality of cigar tobacco is now well known, and a thriving cigar factory has been established, with expert makers of home-made and home-grown cigars, which are gaining favour daily over the whole Domin-

ion. The meeting was largely attended, and an interesting discussion took place on plant diseases and the weeds of the farm. Specimens were shown of the Leaf Spot of the tobacco, of diseased potatoes, and of Poverty Weed. The last named is a deep-rooted perennial, a native of alkaline lands, and a most difficult enemy to eradicate.

These meetings in British Columbia were satisfactory throughout, and the wish was frequently expressed that the speakers would soon return to hold similar meetings.

On the way home, stops were made for one day at Glacier and two days at Banff ; at both of these places we were favoured with magnificent weather and consequently large collections were made both of plants and insects. From Nepigon, Calgary, Mount Arrowsmith, Mount Ché-am, Glacier and Banff, parcels of living roots were despatched for cultivation in the botanic garden at the Central Experimental Farm.

Ottawa was reached at 5.30 a.m. on the first of September.

I beg gratefully to acknowledge the courtesy of the Superintendent of the western Division of the Canadian Pacific Railway, who gave me free transportation over all parts of the C.P.R. system during the above investigations.

DIVISION OF ENTOMOLOGY.

CEREALS.

The cereal crops of the Dominion this year made on the whole a good showing. Throughout the West the crop of all small grains, with the exception of oats, is unprecedentedly large and of good quality. The conditions in Manitoba and Assiniboia were far more favourable from the beginning than in 1900. The spring opened with fine weather, and there was little rain until the end of May. All farm work was therefore pushed forward. The ground was well charged with moisture from the rains of the previous autumn, and crops got a good start. In Alberta the weather was wetter, colder and more backward throughout the season than in Manitoba, Assiniboia and Saskatchewan, but throughout the Prairie Provinces the summer was showery, and magnificent crops were produced. In Alberta the excessive rain in spring caused some inconvenience by delaying seeding and haying. August was very fine and all crops rushed forward to maturity with remarkable rapidity so that, although harvest began in Manitoba about the usual date, August 18-20, it was only a week or ten days later in Alberta. The latter half of September was cold and wet with snow throughout the prairie region on the 22nd and 23rd. After this the weather turned very fine, crops picked up well, and all work was pushed rapidly forward. The average yields per acre of the more important cereals are as follows : From the Manitoba December Crop Bulletin, a publication of great accuracy :—Wheat, 25·1 bushels per acre ; barley, 34·2 ; oats, 40·3 ; rye, 23 ; peas, 18·6 ; flax, 12·7.

Mr. George Batho, of Winnipeg, has kindly supplied me with the following concerning the North-west Territories :—

'The yields in Assiniboia, Saskatchewan and Alberta were heavier than in Manitoba this year. Probably the most satisfactory crops were at Indian Head, Regina, Moose Jaw and other points in eastern Assiniboia. Throughout this district wheat must have averaged 33 bushels, and many kinds gave returns of 40 bushels. In Alberta a considerable amount of the crop was uncut when cold wet weather came in September ; this kept the yields from being as high as was at one time hoped for.

'The oat crop throughout the whole Territories was particularly good. The average for Assiniboia, Saskatchewan and Alberta can safely be put at from 55 to 60 bushels per acre. Some damage to oats, and in a smaller degree to wheat, was wrought by cutworms in Manitoba and in a few localities in the Territories. Grasshoppers also reappeared in the same localities as last year in Manitoba, and where not attended to destroyed a few hundred acres of wheat ; but their ravages affected very little the

grand crop of the whole province, and the farmers now know the habits of these insects and have learnt the best ways of fighting them.'

As to the eastern provinces, a general statement applies to all. The crops were good, with the exception of fall wheat in western Ontario, which was badly attacked by the Hessian Fly. The spring opened early with very favourable conditions for growth up to the beginning of July, when there was a period of excessive heat, followed in some parts of Ontario and Quebec, and in the whole of the Maritime Provinces, by a month or six weeks of drought, from which grain crops, hay and pastures, suffered in many places. Some injury was also done to barley and spring wheat by the Hessian Fly and drought. Cutworms in wheat were complained of in the Ottawa valley. One report, the first record of the occurrence of the Wheat Midge in the Prairie Provinces, comes from central Manitoba ; no specimens were forwarded, but the observer, Mr. N. Criddle, is careful and describes the attack accurately, as small light reddish maggots tapering towards the head and clustered around the grains inside the chaff. The Grain Aphis was unusually destructive in several localities in the North-west Territories.

The pea and bean crops in Ontario have been short and low in quality, due chiefly to hot weather. Peas have been much attacked by the Pea Weevil, and many farmers, as a consequence, are turning their attention to the Grass Pea or Chickling Vetch (*Lathyrus sativus*, L.), which gives good crops of 10 to 30 bushels of seed per acre, suitable for nearly all purposes for which peas are used and also perfectly free from the attacks of the Pea Weevil. In Nova Scotia the Black Bean Aphis, or 'Black Dolphin,' has attacked Broad Beans and Horse Beans, so severely in some places as to ruin the crop.

The PEA MOTH (*Semasia nigricana*, Steph.) occurred in some places, but not to the same extent as is frequently the case. At Ottawa there were so few of the caterpillars in cultivated peas that some experiments in spraying the plants with arsenites were rendered useless because neither the treated rows nor those left unsprayed as checks, showed any infestation. A plot of the Beach Pea (*Lathyrus maritimus*, Bigelow), however, was badly infested by this insect or an allied species which worked in the same manner and destroyed nearly half the seeds.

The DESTRUCTIVE PEA APHIS (*Nectarophora destructor*, Jnsn.), which was a most destructive enemy throughout Canada east of the prairie region during 1899 and 1900, and also attacked the clover to a less degree, has almost entirely disappeared ; only a single report of its presence was received. This was from the Island of Orleans, in the province of Quebec. Inquiry from correspondents at several places where it was abundant and destructive in 1899 or 1900, revealed that it had disappeared as suddenly as it had come.

THE GRAIN APHIS (*Siphonophora avenæ*, Fab.).—The plant-lice so often seen upon wheat, oats and rye are well known to farmers. They sometimes occur in vast numbers, but generally disappear suddenly just as the grain is beginning to change colour, as a rule, being destroyed by their many parasitic and predaceous enemies. It is very seldom, however, in Canada, except in restricted areas, that these insects do much harm to the crops attacked. The Grain Aphis multiplies with great rapidity and the insects may be found of varying colours—green, yellow, reddish, or blackish—and of all sizes, on the plants at the same time, on the stems and heads in June and on the leaves in the autumn. These plant-lice in shape are of much the same appearance, but there are frequently more species than one present. Unfortunately there are no practical artificial remedies against grain plant-lice which can be applied on a large scale to fields of grain.

During the past summer there have been rather more important injuries by this insect than usual in the West—three or four slight attacks in Manitoba and two bad ones in the Territories. It is important, however, to state that these outbreaks are, as a general thing, put a stop to by natural enemies. Amongst these some of the most

efficient are small active parasitic insects of the hymenopterous genus *Aphidius,* which fly about among the colonies of slow moving plant-lice and lay their eggs in them. These hatch and the grubs feed inside their victims and destroy them. Infested plant-lice become swollen and hard, and subsequently the parasites emerge through a round hole on the back, or, others of the genus *Praon* coming out beneath the body, spin their cushion-shaped cocoons by which the dead plant-lice remain attached to the plant. In addition to these, several kinds of lady-bird beetles destroy vast numbers, both as perfect beetles and when in the dark-coloured crocodile-like larval form. These lady-bird beetles are oval in shape, flat beneath, and on their red or yellowish rounded backs bear two or more black spots. These well known beneficial insects are so frequently misjudged in their friendly relations with farmers that it seems well to give the above brief description, and again to mention that they are almost invariably friends and should not be destroyed.

The tapering slug-like larvæ of the *Syrphus* or Hovering Flies, about half an inch in length, are also invariably present where there are plant-lice and destroy enormous numbers of them.

'Regina, Assa., August 22.—I send you by this post samples of grain and insects on wheat. On the farm of Mr. Bell, of Davin, green insects have appeared. When I heard of this I drove to his farm. He showed me how the insects had emeralded the canvas of his binder, but, when we went to the fields, the insects were gone. He showed me how they had done damage, and we got a few of the insects which I send.'—N. F. Davin.

'Hicksvale, Assa., August 23.—I am sending you a few heads of wheat inclosed in an envelope with a green insect on them. You can see by the berry how they have affected the grain. It is something terrible the mischief they have done in my wheat fields. They are also on some of my neighbours' wheat. Please let me know what the name of the insect is and if any remedy is known, should it attack my wheat another year.'—J. J. W. Bell.

'Hicksvale, Assa., September 4.—I am sending you a parcel of wheat heads in a large envelope. As you will see, some of the heads are perfect, while others are very poor, with some good berries on the heads. There is a very small insect ; if you will take the bunch of heads and strike them on a white paper a few times, you will find plenty of the insects. I secured some of these by spreading some paste on paper and sticking them on it, which I will inclose in this letter, also some bugs which seem to me to be hunting for and eating the insect. No. 1 is the small insect which you will find on wheat heads. No. 2 is the bug which appears to be eating No. 1. No. 3 is another insect which has infested my wheat fields, also my neighbours', and destroyed hundreds of acres. I may say that there is a lot of wheat which was attacked by No. 3 that is not worth cutting, and is not being cut. I have in patches about 30 acres, I think, which I am not going to cut. Please let me know as early as possible what these insects are and how they affect the wheat.'—J. J. W. Bell.

The insects sent by Mr. Bell were : No. 1, a *Phlœothrips* of an undescribed species, the characteristic marks of the presence of which were very apparent on the green chaff of the wheat heads sent. No. 2, the Thirteen-spotted Ladybird (*Hippodamia 13-punctata,* L.), a persistent and always abundant enemy of plant-lice in the West. No. 3, the Grain Aphis, which had evidently injured the grain to a serious extent.

'Hicksvale, Assa., October 15.—Yours of the 11th September to hand in due time. I examined the standing wheat and could not find any of the insects which you call a *Thrips,* but I should think, if they had been on it, that they would have left it, as it was dead ripe and no substance in it for them to feed on. You seem to doubt that the grain was injured by the insect you call the Grain Aphis. To let you know how thick they were, the first day I was cutting wheat, there was a strip of grain only a few rods wide in the piece infested by them, and before night my binder canvas was coloured

green, a good deep green, where the heads of wheat fell on them, and on the decks these insects were creeping around almost as thick as they could. I did not cut any more wheat for about four or five days, and then the majority of them were gone. Would burning the stubble be of any benefit? Quite a few farmers in this section have had their wheat destroyed in the same way as mine, and some of them think it is frosted, but, instead of being blackened like frosted wheat, it is a very light colour like fall wheat.'—J. J. W. BELL.

'Pincher Creek, Alta.—Kindly inform me what kind of a creature is inclosed in box herewith. It is found in large masses on the binder after cutting a field of oats sowed on new breaking this spring.'—A. E. COX.

WHEAT-STEM MAGGOT (*Meromyza americana*, Fitch).—The fly of the Wheat-stem Maggot is a very common insect all across the prairies, and more or less of the conspicuous 'white heads' due to the attacks of the maggots may nearly always be seen in any field of wheat. In the enormous crops of the past season these attacks were seldom noticed by wheat growers, but a few farmers sent in specimens or injured stems with inquiries as to the cause. Some of them were from Pilot Mound, in Manitoba, and from Whitewood, Indian Head, Grenfell and Sumner, in the North-west Territories.

THE HESSIAN FLY
(*Cecidomyia destructor*, Say).

The ravages of the Hessian Fly in the fall wheat crop of Ontario, sown in 1900 and the spring wheat of 1901, have been more extensive than for many years. Barley has also suffered seriously in a few places reported from, as well as doubtless in many others from which no reports have been received. In a bulletin issued in August last by Prof. Wm. Lochhead, of the Ontario Agricultural College—one of the most complete, concise and useful bulletins upon an entomological subject which has ever appeared in Canada—the total loss caused by the Hessian Fly in the province of Ontario in 1901 will not, it is stated, fall below $2,500,000. This estimate, I believe, is placed too low, as recent reports show that the infestation of spring wheat was much wider spread than was known at the time the above statement was written. In the Ontario Crop Report for November, 1901, the fall wheat crop is stated to be 'a good deal below the average from various causes. In the western counties the ravages of the Hessian Fly were great and much of the surviving grain was light in weight on account of the extreme heat and drought of June and July. Reports from the eastern section—which is free from the Hessian Fly—are somewhat more favourable, especially as regards the Ottawa valley, and East Midland counties, where the crop was a fair one, the principal causes of injury being the excessive early rains and the drought before harvest, owing to which much of the grain is shrunken.' Although in the main the above statement as to the Ottawa valley is correct, all crops of the small amount of fall wheat which is grown in the Ottawa district, were not altogether free from the Hessian Fly, and spring wheat was very badly attacked in some places. Some varieties on the experimental plots at the Central Experimental Farm were injured to the amount of 40 per cent. No mention of Hessian Fly was made this year by correspondents in the Maritime Provinces, and very few reports of injury have been received from Manitoba where it was so very destructive in 1899.

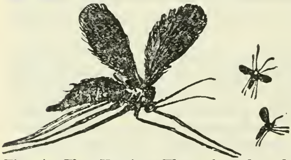


Fig. 1.—The Hessian Fly—enlarged and natural size.

Among a large number of correspondents who have favoured me with reports upon their observations on the Hessian Fly during the past season, I am under special obligation to Mr. John C. Wallis, of Manor Farm, Ferguson (Middlesex Co.), Ont., who has kept me well posted throughout the season on the condition of the infestation. The following is a résumé of his observations which are tolerably representative of the conditions in the south-western counties of Ontario where much fall wheat is grown.

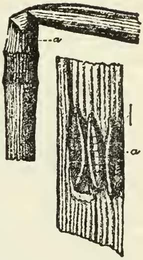


Fig. 2.—Hessian Fly: injured wheat-stem; three puparia—enlarged.

'December, 1900.—Wheat plants full of fly.

'January, 1901.—A mild month. Hessian Fly still to be found in plants above the ground.

'February.—A furious winter month. Heavy snow and plants well covered.

'March.—Similar to February.

'April.—Open and mild, with a very cold and dry parching east winds, which have completely killed all injured wheat plants.

'May 1.—Have had several wet days, but it is now dry. A conspicuous absence of fly, with thinned prospects for wheat.

'May 6.—Upon the snow going away, I made close examination and found some of the flax-seeds. I have just put the twin ploughs on some 9 acres and turned it under. There was an absence of winter-killed wheat, except of the injured plants. The fly has worked my fields and my neighbour's to the extent of cutting out four-fifths of the wheat, and, as the land is very strong, it would grow weeds, so we have sown barley. Of course, I am quite alive to the danger of the fly getting into that. Many farmers are drilling barley across the fields with the hope of getting a mixed crop, and, if the fly should take it, we can plough it down for manure.

'June 1.—Since the beginning of May the weather has been continuously cold and damp ; the fly has made great headway.

'June 16.—Inclosed you will find a few specimens of the work of the Hessian Fly. As before stated, I found one stalk infested by no less than 55 flax-seeds. I have commonly been informed of 15 to 40. There are farmers now ploughing up their fields. There is but one outcome, namely, a suspension of wheat culture for a period, unless something unforeseen intervenes to rid us of the pest. I have made a minute examination of the growing barley, and at the time of writing have found no sign of the fly in it, nor in the rye. I notice that Prof. Lochhead recommends late sowing, but this, I believe, is no great safeguard. Late sowing renders the plants so much weaker that the fly seems to be all the more at home in their tender, juicy state.

'August 31.—I mentioned to you that I had sowed barley where I had ploughed down deeply my wheat, which was killed by Hessian Fly. This barley came along royally until it began to make the second and third leaves, when it turned yellow. Upon examination, I found it thoroughly infested. This was ploughed twice, and the land being mellow and rich, I am going to seed it down again with Red Poole wheat, so as to get it seeded out. On this piece I am going to depart from my early and late practice and shall sow from September 10 to 13. I know that the chances of getting a crop are against me, but I prefer to seed down with wheat, and, although I find that no remedy is always effective against the fly, good cultivation and proper rotation are essentials. Even these, however, are no guarantees of a crop. All the grain here this year is surprisingly light and disappointing. Oats are very light indeed ; roots also have suffered and are the lightest for years. Corn is now doing tolerably well and, if frost keeps off for a time, we may get an average crop. Altogether I have not seen such an extreme season in all my experience.'—J. C. WALLIS.

Mr. Wallis reported from time to time on the fields sown after the barley was ploughed down. He sowed at the date mentioned above (Sept. 10-13) with the soil

in good condition as to moisture and very carefully prepared. The seed was thoroughly cleaned and the wheat came up promptly. Writing on November 16, Mr. Wallis reported that there was hardly any Hessian Fly to be found in this field, while other fields in the same locality sown on August 30 and September 1, were badly affected.

It may be pointed out that September 10 for the county of Middlesex, where Mr. Wallis's land is situated, is the date given in Prof. Lochhead's bulletin as the average date when wheat may be sown there with safety. As has been frequently stated, the emergence of the adult Hessian Flies is dependent to a very large measure on the weather, considerable moisture seeming to be necessary before the flies will leave the puparia. This accounts for a somewhat wide range in the dates when the majority of the flies appear in any season. Prof. Webster, of Ohio, who is one of the highest authorities concerning the Hessian Fly, says :—' The dates after which sowing can be safely undertaken in the State of Ohio vary over a period of at least a month from the northern to the southern latitudes of the State, or approximately from September 10 in the north to October 10 in the south. Wheat sown after the dates mentioned or after intervening dates in intervening latitudes will germinate in normal seasons after the Hessian Fly has appeared, and be free from attack.'

If a farmer who intends sowing fall wheat will watch the weather during August, he may calculate pretty well for himself when it will be safe for him to sow. As Prof. Lochhead has pointed out, ' the farmer, if he wishes to grow wheat free from the fly, must follow the season rather than the almanac ; for the best date for one season may not be the best date for another. For instance, a rainless August, such as we had in 1899 and 1900, will retard the emergence of the fly for two weeks, but an August with a considerable rainfall during the last two weeks will bring forth the flies about September 1, to deposit their eggs ; in which case it will be quite safe to sow according to the dates given.'

From the above facts it is manifest that no definite dates can be fixed upon for every year, but at the same time average dates of safety may be mentioned as the proper time for sowing fall wheat, as far as injury from the Hessian Fly is concerned. Prof. Lochhead says :—' It seems not safe to sow, in ordinary seasons, before September 15, in the counties bordering on Lake Erie, and the tract of land occupying the valley of the Thames. In the next row of counties, including Lambton, North Middlesex, Oxford, Brant, Wentworth, and those bordering on Lake Ontario, the probable safe date would be September 10, while in the counties farther north, the safe date may be placed at September 5.'

The only objection to sowing late—at the end of September instead of at the end of August—is that the plants, it is claimed, have not time to make vigorous roots and tops so as to withstand the cold of severe winters. I have, however, frequently seen excellent crops which were sown late in September, and, as long as the Hessian Fly is abundant, I have no hesitation in recommending farmers sowing fall wheat to delay this operation until the end of September. There certainly is an advantage in sowing early, but this is not sufficient to offset the risk of losing the whole or a large percentage of the crop from the attacks of the fly. Prof. Zavitz, Experimentalist, of the Ontario Agricultural College, has kindly favoured me with the following data :—

' Guelph, May 3.—In the average of four years' experiments in sowing wheat at different dates, we find that by sowing from August 25 to 26 we get an average yield of 44 bushels per acre ; from sowing September 2 to 3, an average of 39·4, and from sowing September 17 to 20, an average of 37·3. There is, therefore, a difference of less than 7 bushels per acre between the yield of the first and last seedings.'

Parasites.—Parasites, but in small numbers, have been reared from almost every district from which we have received specimens of the Hessian Fly this season. In no cases, however, were these parasites in such numbers as to warrant the hope that the Hessian Fly would be very much lessened in numbers next season. Nevertheless, past experience has shown that parasites may sometimes be present in sufficient num-

bers to reduce materially some serious outbreaks of insects without being noticed even by careful observers.

Remedies.—The habits of the Hessian Fly and the best remedies are widely known by those concerned, and with co-operation a great deal can be done to reduce the injuries by this most destructive insect enemy of our staple crop. The best remedies are :—(1) Late sowing, preceded by trap crops sown in August and ploughed down by the middle of September ; (2) Thorough preparation of the land—Prof. Webster lays great stress on this ; (3) The burning over or ploughing down of stubble on fields which have been infested ; (4) The burning of screenings and refuse after threshing ; (5) The use in spring of quick-acting fertilizers upon a slightly injured crop.

CUTWORMS IN GRAIN.

Injury to growing grain by cutworms has been complained of more frequently than usual. By far the widest-spread and most disastrous outbreak was in central Manitoba toward the end of June. Reports of injury were received from Minnedosa, Baldur, Springfield, Kildonan, Niverville, Miami, Roland and Rosebank. The loss in oat fields in the Carman district was great. The Hon. R. P. Roblin, the Minister of Agriculture for Manitoba, who lives in this district, told me when examining these fields with me that he had never seen such an outbreak for twenty years. Many fields of oats which had been eaten bare, were sown again to oats or to barley. One very remarkable feature of this occurrence was that the cutworms, although showing a great preference for oats, would also eat wheat and to a much smaller extent barley, but if they began on any one of these crops, they seldom spread into another. A great many oat fields were seen which had been eaten almost, or quite bare, right up to the edge of a crop of wheat with nothing whatever intervening, and the wheat plants were apparently quite untouched. Occasionally, but very rarely, the opposite to this was observed. At the time of my visit, July 1, most of the cutworms had already attained full growth and it was difficult to find them. Such as were found proved to be the Red-backed Cutworm (*Carneades ochrogaster,* Gn.). This species seems to be very peculiar as to its food habits. It is one of the commonest and most destructive cutworms in the Ottawa valley where it attacks particularly spinach, cabbages, tomatoes, beet-root and onions. In grain fields and on unworked land it confines its attacks almost entirely to the Lamb's-quarters (*Chenopodium album,* L.), a wild spinach, and I have many times noticed grain fields, of both oats and wheat, in which every plant of Lamb's-quarters had been eaten down, but not a single stem of the grain was touched. I was therefore very much surprised to note its unusual habit in Manitoba of attacking growing oats and wheat. Where very abundant, however, it did not always confine itself to a single food plant, for in a garden which I visited at Morden, Man., all kinds of vegetables had been destroyed.

The injuries in grain fields in the Ottawa district in Ontario were by a different species of cutworm, namely, the Glassy Cutworm (*Hadena devastatrix,* Brace). These greenish white caterpillars with reddish heads, unlike many other cutworms, seldom come above the surface of the ground, even at night, but lie hid among the roots of various kinds of grasses, cutting off the shoots at the base. These were reported by Mr. Meredith Caldwell as having done much harm in wheat and oat fields at Luskville, near Eardley, Que. They were worst on clay and marl ridges, but were also very destructive on level clay lands. Prof. Lochhead also tells me that about Gravenhurst, Muskoka, many fields of oats 15 to 20 acres in extent were badly injured by the same cutworm between May 10 and 25. This species as a rule is only troublesome in grain fields sown on grass lands which have

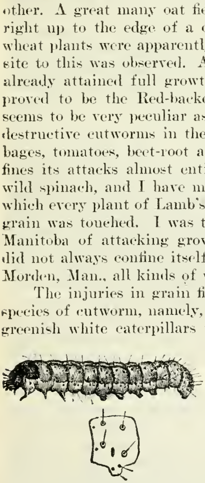


Fig. 3.—The Glassy Cutworm.

recently been ploughed up. As the caterpillars remain beneath the surface, it is almost impossible to reach them with any remedy. In my report for 1898, I refer to an attack by this same cutworm on a field of oats which had been almost destroyed in the last week in May. At that time the caterpillars were almost full grown and very effective work in the way of cleaning the land was done by turning on flocks of chickens and turkeys which devoured large numbers, but soon crows took so many of the young chickens that the poultry had to be shut up again. However, I am quite sure from what I know of the habits of crows that they kept on at the useful work of destroying the cutworms. By June 8 the caterpillars were full grown or they had been eaten by the chickens and crows, and the land was again sown and produced a heavy crop.

Fig. 4.—The moth of the Glassy Cutworm.

A knowledge of the habits of even such common insects as many of the various kinds of cutworms is frequently of much money value to farmers. When insects appear in large and destructive numbers most of them become full grown, and as in the case of cutworms cease feeding at about the same time. Therefore if enough is known of their habits to recognize when they are full grown and consequently will not eat any more, a field may be re-sown at once without any danger and with no unnecessary loss of valuable time.

Cutworms are very seldom noticed until they are nearly full grown and their depredations are so great that they attract attention by their inroads upon a crop. In most instances these attacks are not reported until it is too late for remedial measures. This was generally the case in Manitoba last spring, although the moths were noticed as particularly abundant in 1900 by collectors of insects. Mr. A. W. Hanham, of Winnipeg, writing on the insects of the season in December, 1900, says '*C. ochrogaster* (the parent moth of the Red-backed Cutworm) was by far our most abundant cutworm moth this year. I never went out during their season without seeing them in such numbers as to be a perfect nuisance when collecting.' Practically the same report was received from Mr. E. F. Heath, of Cartwright, Man., Mr. H. W. O. Boger, of Brandon, Man., and Mr. L. E. Marmont, of Rounthwaite, Man.

'Morden, Man., June 6.—In this country the cutworm is undoubtedly with us every spring time, but never before in the history of the country did it work so much damage as it did this season. Usually manifesting itself entirely in the gardens, it this year during the dry month of May invaded the grain fields and in several localities in this district has already done great damage to the growing crops. Many fields of grain were completely eaten off. The grubs seemed to have a preference for oats, but wheat also suffered. One farmer reports 70 acres of growing wheat completely destroyed, and another, 40 acres of oats as bare as though never planted. Reports of serious losses from this cause are general, and the infliction appears to be serious enough to call for investigation. Unlike the grasshopper, the cutworm is a regular institution of the country, and its operations this season show that it may develop destructive powers heretofore unexpected. Some of the farmers here are ploughing up and re-seeding the grain fields destroyed, although this seems to be a useless proceeding while the worms are still in the soil to eat it off again. It may be stated here that there is a general impression that any plant cut off by the worm will not grow again, but this is open to question. In most cases the plant is undoubtedly destroyed, but it is not so in all cases, and grain crops certainly ought to come again, the same as if cut down by severe frost. It is a new experience here for grain fields to be seriously damaged by the familiar cutworm and is no doubt to be accounted for by the unusually favourable conditions. The worm thrives in loose dry soil, but it cannot reproduce itself, because the cutworm is a true caterpillar and does not reach its full development till mid-summer when it completes the round of its existence by becoming a moth.'—J. F. GALBRAITH.

'Morden, Man., June 21.—Since the rains came, the operations of the worms are not so noticeable, but I found them recently as plentiful as ever in my garden, and a good many small ones also which appear to have been recently hatched.'—J. F. GALBRAITH.

I visited Mr. Galbraith's garden at Morden on July 1 and had an opportunity of seeing the great destruction which had been wrought by the cutworms among peas, cabbages, cucumbers and other vegetables. At that time there were none of the insects to be found, and Mr. Galbraith and others in the same place were of the opinion that they disappeared about June 20. Some Indian corn, which appeared above the the ground after that date, was growing vigorously and had not been touched.

Telegram.—'Miami, Man., June 10.—Brownish cutworms destroyed oat fields. Will it be safe to resow immediately with barley ? Worms still numerous. Wire.'—THOS. RENWICK.

Reply.—'Do not resow for ten days, am writing.'—J. FLETCHER.

After telegraphing the above reply, Mr. Renwick was written to for specimens, and advised to watch the development of the cutworms, and not to sow until some of them were seen to be changing to chrysalids. The poisoned bran remedy was also recommended.

'Miami, Man., June 15.—I send you cutworms now. I looked carefully, but could not find a single chrysalis. The worms are still numerous, but the weather is now damp and wet, and they appear to be cutting the grain off a little above the surface, instead of below it as in the dry hot weather, so I do not think they will now do so much damage. A good deal of seed grain has been lost by re-sowing too early. One farmer had 70 acres of wheat destroyed. He re-sowed at once with wheat and also lost it. On my own adjoining farms the worms do not touch the wheat, although numerous in the ground. Another farmer sowed a mixture of wheat and oats for feed ; the worms took nearly all the oats. On the same farm a five acre patch was completely cleared in the centre of an adjoining wheat field. It looks as if there were two varieties at work, one of which will not touch wheat. I have farmed here for twenty years and never before sustained any damage from cutworms. Do you think they will be likely to recur again ? I notice they also eat barley, which is only now coming up, since the rains came.'—THOS. RENWICK.

'Brandon, Man., June 21.—The Director wishes me to send you specimens of some cutworms which are doing a lot of damage here this year. I am mailing you under separate cover one feeding on flax and another on oats ; the loss from the one feeding on oats is quite serious. Southern Manitoba papers are full of accounts of the loss in oat fields, and Sir Wm. Van Horne's foreman at Selkirk writes me that he has lost nearly all his oat crop from their ravages, over 100 acres. We have only lost four plots of oats of one-twentieth of an acre, and two plots of flax. They are still working at the flax but have about stopped on the oats.'—S. A. BEDFORD.

'Winnipeg, December 10.—So far as I have been able to learn, the damage occasioned by the ravages of the cutworms in oat fields occurred mostly in the Balmoral district, north of Winnipeg, and throughout Springfield, east of this city.'—GEO. BATHO.

Remedy.—The well known poisoned bran remedy was about the only one which could have been used effectively against such an outbreak as that recorded above. This could certainly have been used with much advantage in gardens. For field practice, probably the best course in such an exceptional visitation was that adopted by Mr. Renwick, viz., to watch for the date when the cutworms become full grown and then re-sow the land either with a crop for green feed or late roots. When grain has been sown on stubble in the West, turning the land down for summer-fallow would be advisable.

The Red-backed Cutworm is the caterpillar of a brown moth (*Carneades ochrogaster*) about an inch long when the wings are closed, which lays its eggs in the autumn upon weeds and other vegetation. The eggs hatch the following spring and the young caterpillars are seldom noticed while they are small. Land, which is allowed to bear a crop of weeds in the autumn, is therefore more likely to attract the moths to lay their eggs than land which is kept clean. The destruction then of all useless vegetation and particularly of weeds in the autumn is a good preventive remedy against cutworms of many kinds.

GRASSHOPPERS.

Locusts, or as they are more generally called Grasshoppers, have again this year been the cause of considerable loss in some places, particularly in Central Manitoba and in parts of the interior of British Columbia. Outbreaks more or less severe were also reported from western Ontario, New Ontario, and Nova Scotia, but these occurrences, although severe, were of short duration. Much more important were the ravages of grasshoppers in the West.

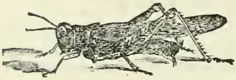


Fig. 5.—The Rocky Mountain Locust.

In Manitoba, spring opened later in 1901 than the previous year ; as a consequence, grasshoppers also appeared later, and, as the conditions for growth of all kinds of crops were most favourable, there was every hope that there would be no injuries by grasshoppers. The appearance of the crops was so unprecedentedly good and there was on the prairie such exuberant growth that it seemed to farmers impossible that these insects could affect the crop. However, in certain localities active measures were necessary. Some fields of large extent were stripped bare, and others were only saved by energetic and persistent work. On the whole, therefore, although loss from these insects did not appear to affect the enormous total grain yield of the province, 85 million bushels, it was a serious matter for some farmers in the localities visited.

The development of this outbreak is described in the following correspondence :—

'Winnipeg, April 15.—Last week we had very fine warm bright days, and I have received a report from the Stockton and Treesbank districts that young grasshoppers are hatching out in millions. Yesterday was cold, and last night we had frost ; to-day it is thawing a little. I am hoping that this severe weather will finish most of the grasshoppers, or at least be a check to them.'—Hugh McKellar.

'Winnipeg, May 29.—I regret to advise you that grasshoppers are again becoming a menace to the farmers in the districts where they were prevalent last year. Ten days ago I visited the districts north of Methven and east to Treesbank. Only very few could then be found, all in the first stage. It was impossible at that date to estimate what another week or two would bring about. I am now advised by Mr. Norman Criddle and Mr. Cullen, of Aweme, and Mr. Jerome Henry, of Stockton, that they are likely to be as bad as last year, although you will notice that the date is later than last year's trouble. Farmers are asking for Paris green and I have already sent out 50 pounds by express. This is to carry on the fight against them on the plan given by Mr. Norman Criddle, and referred to in your last annual report. I have also just been advised that locusts have appeared in great numbers on the Eastern Mennonite reserve, municipality of Hanover, at the village of Chortitz and other villages in the district. The Minister of Agriculture would be pleased to have you spend a few days here before going west to the Territories in connection with your summer's work. I should be pleased to have any suggestions you wish to offer in the way of fighting the hoppers.'—Hugh McKellar.

'Winnipeg, June 6.—I have just received your favour of the 3rd inst., and will now report further on the grasshoppers. The last two weeks of May were dry and the last week hot and dry. Everything was favourable for the grasshoppers, while wheat

was, practically speaking, at a standstill. The grasshoppers are later this year than last, being only in the second or third stage when I saw them on Friday last ; in fact, many of them were still in the first stage, and I suppose others were not yet hatched. You could readily notice, as you drove from farm to farm, where they were doing damage, a strip was eaten clean off from 3 to 10 feet wide, and sometimes a corner extended in, on a rise of ground, 20 feet or more. Farmers told me that, where fields were ploughed last spring or early this spring, no hoppers had appeared. The trouble is all from stubble fields not yet ploughed. I have great sympathy with the farmers ; they could not carry out the instructions to the letter as to ploughing all stubble. You will remember that, where we went together last year, and where the trouble is again this season, the farmers on that light soil summer-fallow nearly half of their land each year. Last year the harvest extended almost to snow fall on account of the wet weather, so that farmers could not possibly plough all their stubble land. This year spring conditions were so favourable that it was generally thought that we must be going to have a very big crop ; the farmers, accordingly, tried to put in as many acres as possible, feed for horses was scarce, and the result is that the stubble fields are still unploughed, and their horses are poor. The only remedy I can see for cleaning out the hoppers, if they continue to appear annually, is for farmers to curtail their farming operations, and seed down part of the present cultivated land to brome grass, so that they can handle the remaining portion before the grasshoppers hatch in the spring. The outlook, however, is now hopeful. Rain commenced to fall in the western part of the province on Saturday, coming to Brandon on Sunday, and on to Winnipeg by Monday night. Tuesday was wet, Wednesday cloudy and some misty rain, and today we had wonderful rain and a storm of rain and snow, which of course melts as it falls. I think these conditions are general over the province. I shall anxiously watch what effect the rain has on the hoppers, and, as soon as the weather fairs up, I shall again visit the districts. I hope it may not be for a week or ten days and that this weather will finish the grasshoppers for the season. The growth of wheat and all vegetation will be so rapid that the grasshoppers will be lost in it. I shall be pleased to report to you from time to time about them.'—HUGH MCKELLAR.

'Winnipeg, June 17.—Although the grasshoppers are so troublesome this season, yet I do not think that any great majority of them are *M. spretus*. I have letters from Morden, Altona and Chortitz, as well as from all points where they were numerous last year, asking for investigation and instruction. I understand that they are very numerous at these points. My intention is, at present, to go with you on a flying trip through the whole district to all of these points, so that you may be thoroughly acquainted with the conditions that exist, and may be able to advise the Department regarding any further work which you may think advisable. No doubt some meetings will be held and addresses delivered to the farmers. Rains continue every other day, and from all parts of the province come reports of most wonderful growth of all kinds of vegetation. We have sent out over 1,000 pounds of Paris green, and I am receiving very favourable reports of the success of farmers in destroying the grasshoppers.'—HUGH MCKELLAR.

Mr. McKellar's expectations as to the early disappearance of the grasshoppers were only partially fulfilled. The wonderful growth of all vegetation certainly prevented what would have been serious loss in an ordinary season.

'Brandon, Man., June 28.—On the light land near Sewell, grasshoppers have been very bad lately. I saw a field of over one hundred acres sown with wheat with not a solitary blade of grain or grass standing—only a few Artemisias. Grasshoppers by the millions were on the roads. I am sending you a few by mail.'—S. A. BEDFORD.

The grasshoppers sent with this communication were all the Lesser Migratory Locust.

At the request of the Provincial Minister of Agriculture, I was instructed by the Honourable Sydney Fisher to proceed to Manitoba to visit the infested districts and,

if possible, assist in the remedial measures which were being taken to prevent loss. I reached Winnipeg on June 30 and at once reported to the Honourable R. P. Roblin, and talked over the whole matter with him and his deputy, Mr. Hugh McKellar. Leaving Winnipeg on July 2, in company with Mr. McKellar and the Rev. W. A. Burman, I visited all the localities from which reports of locusts' injuries had been received. The following report made to Mr. Roblin at the conclusion of this investigation recounts all the chief features of the expedition :—

WINNIPEG, MAN., July 6, 1901.

The Hon. R. P. Roblin,
Minister of Agriculture and Immigration,
Winnipeg, Man.

DEAR SIR,—I have the honour to inform you that in accordance with your request I have made an inspection of those districts in Manitoba from which complaints have been received by your Department of injuries to crops by grasshoppers, so as to apprise myself of the actual state of affairs and the conditions prevailing, so that, if necessary, I might be in a position to advise you whether, in my opinion, any further steps could be taken by your Department to reduce injury and control this pest.

I left Winnipeg on the morning of Tuesday, July 2, in company with Mr. Hugh McKellar, the Chief Clerk of your Department, and Rev. W. A. Burman. We reached Rosenfeld Junction at 10 a.m., and started at once and drove to Altona (8 miles). Here we were joined by Mr. John Hebert, who kindly came with us to a farm belonging to Mr. Isaac Bergen (4 miles distant), and showed us a field of wheat in the edge of which a swarm of grasshoppers was doing some injury. These were chiefly the Lesser Migratory Locusts (*Melanoplus atlanis*, Riley), a native species, which on several occasions has been the cause of considerable injury. The insects were for the most part immature and unable to fly. A similar occurrence of the grasshoppers in the same state of development was seen at Rosenfeld when we left the train. There were in both of these places some mature grasshoppers with fully developed wings, by which the identification could be confirmed, and also in smaller numbers the Pellucid Locust (*Camnula pellucida*, Scudd.), and the Two-striped Locust (*Melanoplus bivittatus*, Say), but these two latter species were in smaller numbers than the first. At this point good work could be done, as was explained to the farmers, with hopper dozers or the Paris green mixture. These grasshoppers had come from a piece of land left for summer-fallowing where the eggs were laid last autumn.

We then drove 6 miles to Plum Coulee, finding grasshoppers rather numerous all the way, and near Plum Coulee noticed a few of the true Rocky Mountain Locust (*Melanoplus spretus*, Uhler) mixed with the Lesser Migratory species. This occurrence should warn the farmers to be on their guard and to make every effort to plough down, as advised by your Department, all land in crop this year, either this autumn or early next spring before the eggs hatch. It is well known that, although all of the injurious locusts lay their eggs upon bare spots in the prairie, the condition of the soil where a crop is grown is exactly what suits them best for egg-laying, and that the females will by preference resort to these fields to deposit their eggs. During the whole of this investigation we found it an almost invariable rule that where locusts were injuring a crop, they had originated in a near-by stubble field, or in untilled land once in crop but now neglected. Changing horses at Plum Coulee, we drove past Winkler to Morden (16 miles), where we passed the night. From Plum Coulee to Morden colonies of the Lesser Migratory Locust were seen at several places. At Morden, Mr. Galbraith showed us land which had been stripped by the Red-backed Cutworm (*Carneades ochrogaster*), a caterpillar of a species of moth which has been very destructive in many parts of the province during the month of June, particularly to the oat crop, in gardens and flax fields to a much less degree, to barley and in one or two rare instances to wheat. The preference, however, has been decidedly for oats. In the Carman district the preference shown for the oat crop was very remarkable, great injury having

been done, and where wheat fields came right up to the oats that crop appeared to be untouched while the oats were entirely devoured, even twice in some places where the fields had been re-sown too soon. The caterpillars seem to have attained their full growth about the third week in June, and up to that time any growth on the infested oat fields was destroyed. The remedies against cutworms are the keeping down of all weeds in the autumn upon which the eggs are laid or, when the caterpillars are found to be present in the spring, the distribution over the ground of the poisoned bran bait, which has been fully described in the last annual report of the Central Experimental Farm.

Leaving Morden early we drove 7 miles to Nelson, where the Lesser Migratory Locust was found in large numbers, mixed with the Pellucid and Packard's Locust (*Melanoplus Packardii,* Scudd.). We now drove to Rosebank (8 miles) swinging off to Mr. Pearce's farm where locusts were reported. These we found were almost all the Lesser Migratory and the Pellucid Locusts, many of them not mature. Near to Rosebank we found the Rocky Mountain Locust in small numbers. From Rosebank we took the Canadian Northern Railway to Fairfax, which is almost 14 miles south-east of Souris. From this point we drove a mile east to the farm of Mr. W. D. Moffat. Here we found the true Rocky Mountain Locust in enormous numbers, all mature, but still in a soft condition. Mr. Moffat was ploughing down all his stubble land, and intended poisoning with Paris green the following day. We next drove to Elgin where we passed the night, and proceeded to Hartney the following morning. Owing to the very heavy rain during the night, not many grasshoppers were moving, but the Lesser Migratory species and a few of the Rocky Mountain Locust were seen at several places and in too large numbers to be ignored or neglected. We took the train from Hartney on the morning of the 4th to Brandon and attended the annual champion ploughing match on the Experimental Farm in the afternoon. We heard of locusts in large numbers 4 miles north of the Experimental Farm, and a few specimens of the Rocky Mountain Locust were taken on the farm itself. At this point Mr. F. D. Blakely, of the *Nor-West Farmer,* joined our party. Leaving Brandon at 7.40 on the morning of the 5th, we went to Sewell, where great injury has been done this year, and where there was also much loss last year. Mr. Kellet drove us to his fields where the insects were in incredible numbers, almost all the Lesser Migratory species, but also small numbers of several other native species of less importance. Adjoining Mr. Kellet's land were several other crops of wheat which were being rapidly devoured, notably one large field of 200 acres, owned by Mr. Thomas Greenwood. These insects had undoubtedly migrated to the crops from unploughed summer-fallows. Nothing is yet being done, but much could still be accomplished by using the Paris green mixture. Everywhere through the crop, where bare ground showed, were patches of locusts from 50 to 200 or 300 together, and on the summer-fallows, with the exception of a few weeds, such as two of the Wormwoods (*Artemisia frigida* and *A. Canadensis*) and strangely one kind of grass (*Panicum dichotomum*), all vegetation was being rapidly devoured right down to the ground.

Driving towards Douglas, and 3 miles east of the farms mentioned, magnificent crops were seen, but the work of the grasshoppers was evident in many places. The farms of Mr. Moore and Mr. R. Russell were visited. At that of the latter an excellent illustration was found of the value of the Paris green mixture as a practical remedy against locusts. Adjoining a piece of unploughed summer-fallow was a piece of good wheat swarming with the Lesser Migratory Locust, most of the insects in a dying condition. For a space of 50 yards from the edge of this crop, where the remedy had been only once applied two weeks before, the ground was literally strewn with dead grasshoppers, and all along the edge of the head land, where they had gathered during the wet weather, the dead insects were lying in such numbers as to resemble a windrow ; on one spot 117 were counted in 18 inches square. At a corner of a field where, owing to their numbers two applications had been made, the dead locusts were even more numerous. At Douglas we heard of considerable injury having been done

and of the good effects of the Paris green mixture. We left Douglas at 2.30, and drove to Treesbank (25 miles).

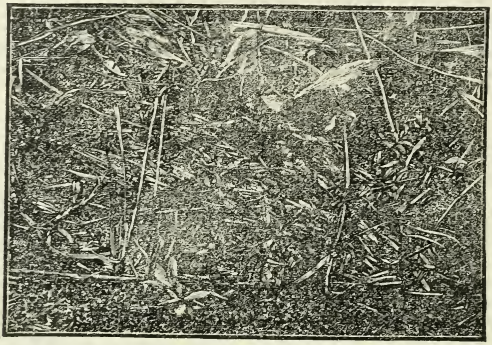


Fig. 16.—Dead Grasshoppers, killed by Paris green mixture.
(From photograph by F. D. Blakeley, kindly lent by the *Nor'-West Farmer.*)

One and a half miles south of Douglas, on the farm of Mr. Agnew, much harm was being done, and also on the land of Mr. H. T. Sibbett, two miles further on. At this point a remarkable instance was observed of the attractive nature of horse manure to locusts. A manure pile outside a stable was so entirely covered with the insects that they could only be likened to the scales on a fish or the shingles on a roof. When disturbed they flew off like a swarm of bees. Here the first instance of the female locusts (*M. atlanis*) laying their eggs was observed. A few miles further on we came to the farm of Mr. T. Fortune, where we found a fine crop of wheat, which had been saved by the use of the Paris green mixture, on land where everything had been destroyed last year. We next inspected crops at Aweme, where magnificent fields were found, all of which had been similarly saved. Mr. Cullen used the remedy regularly, and has saved his crop. The same may be said of Mr. Criddle's crops at the same place. Too much cannot be said of the commendable and disinterested zeal which has been shown by Mr. Norman Criddle and his brothers in experimenting with this remedy, which has been developed and much improved from his experiments, and those of his neighbour, Mr. Vane. As a result he has saved good crops where he would, in all probability, have lost everything. Some of his neighbours are following his example with the same good results. The only assistance he has received is just such as you have given all other farmers who have applied to you, namely a supply of poison.

Leaving Treesbank at 6.30 on the morning of the 6th, we drove 5 miles west to some swarms, which had been previously located by Mr. McKellar, and found the Rocky Mountain Locusts on Mr. Jackson's farm at Banting, where they were injuring wheat around sloughs. Further west, at Mr. Geo. McCluskey's farm, large numbers of the Lesser Migratory Locust were doing much harm on a sandy field. Here a few dead locusts were noticed, which had been killed by parasites (*Tachina*) and the Black Blister Beetles were found, presumably looking for the eggs upon which the grubs of the beetle are parasitic. Returning to Treesbank, we drove to Stockton, calling at the farm of Mr. Jerome Henry, who has saved his crops by using the Paris green mixture. Taking the train at Stockton, we reached Winnipeg at 7 o'clock on the evening of the 6th.

In reply to your inquiry, and as a result of this investigation, I beg to say that I consider the remedy which you have been this year advising, an unqualified success. Through the work of your Department all the known methods of fighting outbreaks of locusts have been tried, and as a result of last year's work special attention has this year been given to the cheap, easy and effective remedy of poisoning with Paris green. The results so far obtained are most satisfactory. If persisted in for another month, excellent and heavy crops will be reaped from many fields, where, otherwise, nothing could have been expected. The efforts of your department in giving instruction and encouraging farmers in the work of exterminating this pest have been all that any Government could do, and I approve most heartily of what has been done. The only suggestion I could have made, would have been to use the hopper dozers, as they were on hand, in some localities earlier in the season, and that possibly a weaker mixture of Paris green than that now used might be experimented with, so as to reduce somewhat the cost of the materials. This, however, I believe, is already being experimented with. Your Chief Clerk, Mr. McKellar, is thoroughly well acquainted not only with the different species of locusts likely to develop into crop pests, but also with their habits, and he has also used or tried all the known methods of remedy or prevention. All of these points I have discussed with him in the field during the past three seasons, and I must congratulate you on the great energy he has shown in giving information and help whenever and wherever needed by farmers who were unfortunate enough to have their crops infested by grasshoppers.

In conclusion, I beg to thank you for this opportunity of visiting the infested localities and seeing the good work which has been done under your orders. I believe the conditions in the districts above mentioned are still sufficiently alarming to require continued effort being put forth of the same nature as you have already adopted, and I most earnestly advise every farmer in all localities where locusts are, or should appear in numbers this autumn, to make a point of ploughing down deeply all stubbles, either before winter or early next spring.

I have the honour, &c.,

JAMES FLETCHER.

Reference is made above to a somewhat unusual injury by the Rocky Mountain Locust, in which wheat had been eaten down for a considerable space around small sloughs in wheat fields. Mr. Hugh McKellar writes of this :—

'Winnipeg, October 7.—You will remember that we noticed with some surprise the wheat plants eaten off around sloughs which were full of water at the time we saw them. This was on Mr. Banting's farm, near Treesbank. Mr. Banting tells me as an explanation of this that, at the time he was ploughing before seeding, grasshoppers were very abundant in the field, many of them being buried and smothered, but some always escaping and being driven before the plough. These took refuge in the grass of the sloughs in which there was no water at that time. All the land about these sloughs was ploughed, so that the only green place where they could get food was among the grasses in the sloughs. When the grain came through the ground, the grasshoppers at once moved into it, and, rains coming on, the sloughs filled up with water and all of the grasshoppers were driven out. The result was what we noticed—a complete circle around the sloughs eaten bare.'

The following interesting report by Mr. Norman Criddle is inserted in full on account of its scientific and practical value.

'Aweme, Man., Oct. 25, 1901.—These notes, taken on the spot, will give an idea of the locust outbreak this summer and how it was controlled in this district :

April 28.—First locusts noticed.

May 15.—Locusts extremely plentiful on abandoned farms.

" 21.—Most of the locusts are out.

" 26.—Locusts begin attacking wheat. Nothing has been done to stop them. Several hundred insects to the yard seen.

May 27.—Locusts are sweeping off the stubble on to the wheat fields.

" 28.—I spread poison up half a mile of wheat for the first time this morning, which has completely checked them, while on the adjoining fields they have advanced twice the distance. A shortage of Paris green experienced ; none to be had in neighbouring towns.

" 29.—I spread more poison ; many locusts dead where it was spread yesterday. The insects have made no further advance, but where not checked, they are rapidly clearing the fields. Lots of Gray Blister-beetles noticed.

" 30.—Nearly everyone is scattering poison. It is having a marvellous effect in checking the advance. Millions are being killed, while others continually replace them from the stubble fields.

" 31.—Locusts have made great advance toward the wheat fields, and some have entered them. We received 50 pounds of Paris green from the Government through Mr. McKellar yesterday. A lot has been spread. Have tried poison mixed with horse dung instead of bran.

June 1.—The horse dung has proved a great success : it is no sooner spread than locusts can be seen leaving the wheat and swarming toward it. There are on an average 25 to the foot dead where it was spread yesterday. Many more are dying.

" 3.—Horse dung has taken the place of bran ; it is much better. Locusts are well under control in this part of the settlement. Some have hatched on the prairie lately, mostly Gomphocerus species.

" 7.—Last three days cold, snow and frost. Locusts very sluggish. Most of the Tachina flies appear to have been killed.

" 9.—Locusts begin to fly.

" 13.—About one-sixth can fly.

" 18.—A quarter can fly.

" 20.—Three-quarters can fly. Mr. Cullen and I found many killed by Tachina grubs on a stubble field. They can be found nowhere else.

" 24.—Locusts begin flying away.

July 2.—Lots flying.

" 3.—Many flying into the wheat and lots over it.

" 6.—Countless numbers flying into the wheat. A few are laying eggs. Great quantities of poisoned mixture are being scattered about.

" 7.—Lots more flying into the wheat and away. They are doing some damage by eating the heads of wheat.

" 11.—Poison has been spread on an average every other day since May 28.

" 13.—Locust mites are getting plentiful.

" 15.—Several locusts found with hair worms in them about 8 inches long.

" 22.—Found a great many infested with Tachina grubs. The locusts had already been killed by poison. One locust had 11 maggots in it.

" 25.—Locusts have ceased migrating. Several found dead on ground ; cause unknown.

" 26.—Two found at different points clinging to weeds. Killed, apparently, by the fungous disease *Empusa grylli.*

Aug. 10.—Most of the locusts are depositing eggs.

" 19.—Eggs very plentiful in patches. Many of the pods have been broken open and the eggs destroyed by predaceous ground beetles (*Amara*), which are very abundant.

" 20.—Locusts laying eggs for second time.

Sept. 2.—Locusts have practically all died or have been killed. A few females yet remain.

'The poison mixture as now used by us consists of 1 part of Paris green, 2 of salt, and 35 to 40 of horse dung (by measure). Mix thoroughly, adding enough water

to make soft, without being sloppy. Scatter well, in quantity according to the number of locusts. They will be attracted for at least 40 feet by the smell. The horse dung is preferable when fresh, but will do several weeks old, even after being washed considerably by rain. The above remedy has proved and must prove a great success wherever used correctly. A simple way to keep locusts on the edge of fields is to sow a strip of rye around them. This grows much more rapidly than wheat and takes a lot of eating down to kill it. By this means the locusts are held where they are easily got at. Ploughing a strip next the wheat was also found effective. In this section all used poison and only a few acres of crop were destroyed. I am convinced that, had we begun the fight earlier, hardly a bushel of grain would have been lost. It is no exaggeration to say that dead locusts could be gathered up in wagon loads and at times be smelt for half a mile. Mr. Cullen, or Mr. Fortune, and one of our family, with horse and rig, kept the locusts from about 600 acres during the entire season. The locusts consisted mostly of the Lesser Migratory Locust (*M. atlanis*). *M. Packardii* was numerous, and there was a small percentage of *M. spretus, M. bivittatus, Camnula pellucida* and *Gomphocerus* species. We are greatly indebted to the Honourable Minister of Agriculture and to Mr. McKellar, his Chief Clerk, for promptly forwarding Paris green when required, and for two visits of the last-named gentleman.

'In reply to your inquiry, we find the following treatment very useful in preventing locusts and crickets from eating binder twine, as they are very apt to do when the grain is standing in stooks. Soak the balls of twine in a solution of 2 pounds of bluestone to 12 gallons of water for half an hour, then dry thoroughly. Introduced by Mr. H. Vane, of this place.'—Norman Criddle.

Predaceous and parasitic insects seem to have increased at Aweme later in the season as the following extracts show :—

'September 15.—I send you two beetles of a species which has several times been found among locusts' eggs, the pods of which were broken open apparently by them. These beetles have been very abundant during the summer in company with several others somewhat similar.'—N. Criddle.

The beetles referred to above were Carabidae of the genus *Amara,* perhaps *A. carinata,* Lec. or *A. laticollis,* Lec., or a nearly related species. Unfortunately the knowledge of this genus is very imperfect. No specialist will undertake to name forms in this portion of the genus with certainty.

'November 15.—I deeply regret that I was unable to get you the locust eggs. All the best ground was ploughed before I had time to hunt. I am forwarding a few partly broken pods. The coating around the eggs is extremely thin this year, much more so than usual ; it is therefore almost impossible to avoid breaking them. The majority of pods in most places are already broken open and the eggs partly destroyed, principally by a small white larva. I am sending a small box containing some of these, some broken pods attacked and a few other insects found in the vicinity of the eggs, which may have helped to destroy them and which may prove of interest.'—N. Criddle.

The white larvæ were those of one of the small blister-beetles, well known parasites on the eggs of locusts. A few of them had changed on arrival at Ottawa to the very interesting pseudo-pupae, a curious extra stage of development which occurs in this family of beetles.* There was also the cocoon of a hymenopterous parasite. Upon inquiring from Mr. Criddle if he had noticed any unusual abundance of blister-beetles, he replied that they were decidedly more numerous last summer than usual, especially a small gray kind, of which several hundred would be seen within a few yards, and then perhaps no more for half a mile. No damage to crops by these beetles was noticed.

Mr. F. D. Cullen, of Aweme, reported that one hundred acres of his crop were destroyed by grasshoppers before he received the Paris green, and that they were attack-

* These proved to be *Epicauta Pennsylvanica,* DeGeer.

ing another hundred acres from every side, but that a few doses of Paris green stopped them promptly and the dead grasshoppers could be gathered up with a shovel. This hundred acres yielded 1,700 bushels of wheat.

Mr. Criddle's investigations and experiments are of great interest, and his discovery that horse droppings may with advantage be substituted for bran is of great practical value. This material is always available on a farm, while bran, which was formerly used as the best vehicle for distributing the poison, costs money and is neither so suitable for holding the poison nor so attractive to the locusts. Mr. Criddle was led to experiment with horse droppings from noticing that locusts flocked to this material whenever it was found lying on roadways. The mixture of horse droppings, salt and Paris green is undoubtedly the most attractive, fatal, and cheap remedy for locusts which I have ever seen used. It is easily distributed with a trowel, or wooden paddle, from a barrel placed in a wagon and driven round the edge of the field. It can be readily scattered for a distance of 20 or 30 feet out into the crop, by a person standing in the wagon. It is only when the locusts are in excessive numbers that this poison mixture would require to be distributed as frequently as was done by Mr. Criddle last summer. On Mr. Russell's farm, poison scattered a fortnight before my visit, although there had been several showers of rain since it was put out, was still being eaten by grasshoppers with avidity, and the insects were found dying all through the crop. As Paris green is insoluble, the mixture remains in an effective state as long as the adhesive properties of the horse droppings last. This remedy should be tried at once wherever locusts occur in destructive numbers. It will be noticed from my report printed above and from Mr. McKellar's and Mr. Criddle's letters, that in almost every instance where locusts were in large numbers, they had originated in land which had been under crop the previous year and which had been left for summer-fallowing during the present season. This accentuates the importance of early summer-fallowing. The ploughing down of all stubbles in localities where locusts have been abundant, should be attended to immediately seeding operations are finished. If this is impossible, it should at any rate be done before the insects reach the winged condition.

The species of locusts responsible for most of the injury in Manitoba were the Lesser Migratory Locust, the Rocky Mountain Locust, the Two-striped Locust, Packard's Locust and the Pellucid Locust. After leaving Manitoba and proceeding westward last summer, it was observed that locusts of all kinds were unusually scarce until British Columbia was reached. In this province much harm was done by these insects at certain places down the Okanagan and Nicola valleys. At the Coldstream ranch, at Vernon, B.C., fodder plants and orchard trees were injured to a considerable extent, and in driving down the Nicola valley from Kamloops to Nicola Lake, the grass on the ranges was found to be much reduced in quantity. Shrubs and Aspen Poplar trees in gullies were also much defoliated. Crops of oats and other grains, as well as turnips and garden plants, were in some places stripped bare. This injury in the Nicola valley was chiefly by the Pellucid Locust, and *M. affinis,* Brun., a species very closely resembling the Rocky Mountain Locust in colour, but closer, I am informed by Mr. E. M. Walker, of Toronto, to *M. atlanis*. It is bright-coloured like the Rocky Mountain Locust, but smaller in size. *M. affinis* was also taken at Kelowna on Lake Okanagan. The locust which was attacking fruit trees at Vernon, was the Lesser Migratory Locust (*M. atlanis*).

ROOT CROPS AND VEGETABLES.

The turnip crop in Canada during the past year, as a general thing, has been good, somewhat affected, however, in some places by the dry weather after midsummer. There was little complaint of the Turnip Flea-beetle, probably on account of the favourable spring.

The Turnip Aphis (*Aphis brassicæ*, L.).—The most serious injury was by the Turnip Aphis in New Brunswick and Nova Scotia, concerning which many letters were received. This attack on the turnip crop seemed to be a new experience to most of the correspondents in the Maritime Provinces. Spraying with coal oil emulsion or with whale-oil soap (1 lb. to 6 gallons of water) at the time the colonies first appear in July and August was recommended, also ploughing the tops down deeply as soon as possible after they are cut from the roots in autumn so as to destroy the eggs.

Cabbage Worms (*Pieris rapæ*, L.).—The green caterpillar of the imported Small White Cabbage Butterfly has been abundant and troublesome this year in many parts of the Dominion. In British Columbia it has spread rapidly over the whole province. The first record of its occurrence there was in 1899 at Kaslo, on Kootenay Lake. Last summer it reached Vancouver Island and appeared in numbers, which were very much greater this year. It was also extremely common in all the older provinces, being frequently referred to as 'the worst enemy of the cabbage.' Mr. C. H. Young, of Ottawa, observed the butterflies in such numbers in the month of June flying over cabbage and turnip fields, that he likened them to a heavy fall of snow. The best remedy, in my experience, for this insect on cabbage, and one which on the Central Experimental Farm has always proved effective, is Pyrethrum Insect Powder, 1 lb., cheap flour, 4 lbs., the whole to be kept for 24 hours in a tightly closed receptacle, the powder to be then dusted over the infested crop by means of special bellows or from a cheese-cloth bag. When, as is frequently the case, these insects attack turnip fields, spraying with Paris green or some other active poison is permissible. This may be done with perfect safety up to September. Two sprayings during the summer are the utmost that will be required, even in a bad season. On smooth-leaved turnips it will be necessary to dissolve a pound of soap in each 25 gallons of water before mixing with the Paris green, or the poison mixture will not adhere to the foliage. On cabbages, Paris green and other poisons must never be used. The insect powder answers all purposes without any danger, which is not the case with Paris green, because the caterpillars eat channels into the heart of the cabbages into which the poison is washed.

The Variegated Cutworm (*Peridroma saucia*, Hbn.).—Notwithstanding the plague of this insect on the Pacific coast last year, there was practically no recurrence of the trouble in 1901. In two instances only was damage to garden crops reported. These were both by Rev. G. W. Taylor, near Nanaimo, on Vancouver Island. Mr. Dashwood-Jones of New Westminster, who made observations on this insect for me last year, reports that moths were seen in some numbers in June, but that no harm was done to growing crops. Mr. J. W. Cockle, of Kaslo, an enthusiastic and careful student of insects, kindly sent me a cluster of the eggs laid at Kaslo, in the middle of June, from which a large brood of caterpillars was reared to maturity, all the moths emerging before winter, about the end of August. Mr. Jones gave the following dates from his notes which add somewhat to the life history of the species :—'The first specimen I saw of the moth of *P. saucia* was on May 20. The eggs hatched on May 30. The last date I saw any moths of the spring brood was on June 13. At the same time I found cater-

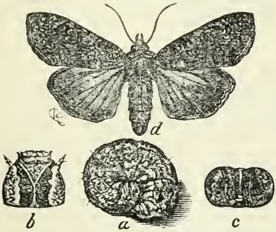


Fig. 7.—Variegated Cutworm ; *a*, caterpillar ; *d*, moth ; *b*, *c*, head and segment of caterpillar.

pillars. By June 23 they were rather troublesome under glass, but of course were soon checked. During the first week of July, I heard of the caterpillars in small numbers in several places, but they soon yielded to the poisoned bran treatment. On July 11, I found caterpillars of all sizes in potato patches, and also the first chrysalids, three in number. On July 22, the greater part of the caterpillars were changing to chrysalids, only small ones to be found. On July 31, the first moth emerged.'

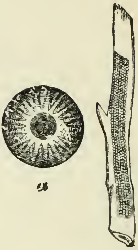


Fig. 8.—Variegated Cutworm ; eggs ; *a*, an egg enlarged.

In visiting, last summer, many places in British Columbia which had been devastated by the Variegated Cutworm during 1900, I made particular inquiries concerning this insect, but except in the localities mentioned above, it had not been observed at all. I was shown, by Mr. Tom Wilson, a collection of moths reared from cutworms which had done great injury in his garden at Vancouver in 1900 and was surprised to find in almost equal numbers with the moths of the Variegated Cutworm, specimens of the beautiful moth *Eupsephopœctes procinctus*, Grt., the caterpillars of which Mr. Wilson assured me were, in his garden at any rate, in equal numbers with those of *P. saucia.* He had noticed that the larvæ had differed a good deal, but had saved no specimens. I have pointed out frequently to my correspondents that I shall always be very much obliged for living specimens sent by mail of any injurious insects, however abundant or common they may be. I should in this instance have been particularly glad to see some of the cutworms of the moth *E. procinctus.*

Cutworms.—Cutworms of various kinds in different parts of the Dominion have as usual been the cause of more or less injury in gardens. One of the widest-spread and most destructive species of which specimens have been sent in from localities ranging all the way from Manitoba to Nova Scotia was the Red-backed Cutworm (*Carneades ochrogaster,* Gn.). The poisoned bran remedy has almost invariably given satisfaction to those who have tried it. Unfortunately, some applicants for advice have been so unpractical as to condemn this most useful remedy without trying it. By experiment, I have proved that not only is it of great value in gardens, but it may be used advantageously even in field practice. When cutworms are sufficiently abundant to cause wholesale destruction, they, as a rule, assume the habit of army worms, moving in large numbers from place to place as food becomes scarce, and it is frequently possible to head them off from further progress by scattering poisoned bait in front of the army.

Root Maggots (*Anthomyia*).—As is the case every year in some localities, cabbages, cauliflowers, radishes and onions have suffered much from these troublesome insects. They were decidedly more abundant than usual in some places in western Assiniboia and around Calgary, in Alberta, and also on the coast of British Columbia. Mr. Dashwood-Jones reports the Cabbage Maggot as abundant in the roots of cabbages of all kinds by May 15. At Ottawa, radishes and onions were being killed by the middle of June, and cauliflowers and cabbages by the end of the same month. Disks of tarred paper, slit from the margin to the centre and placed around the stems of cabbages at the surface of the ground at the time of planting, gave excellent results ; and plants treated by sprinkling a little sand impregnated with carbolic acid mixtures were protected in a large measure. Dusting hellebore along rows of radishes from the time they appeared above ground, once a week, also rendered them to a large measure free from the maggots. Kainit and nitrate of soda had little effect on radishes, but were very useful on all kinds of cabbages by inducing quickly a strong and vigorous root growth. The small staphylinid beetle *Aleochara nitida,* Grav., which is certainly a true parasite on these maggots, occurred in large numbers on some sandy lands at

Ottawa, and by the end of the season hardly any maggots or pupæ could be found in a place where they are usually very numerous. Another parasite also occurred with the above, but in smaller numbers, namely, *Eucoila anthomyiæ,* Ashm., a small black four-winged proctotrypid fly.

The Asparagus Beetle (*Crioceris asparagi,* L.)—This beetle and The 12-spotted Asparagus beetle, which have been mentioned in my last two reports as occurring commonly in the Niagara peninsula, have this year spread farther through the country. Prof. Lochhead found both species at Guelph, Ont., and noted that the 12-spotted species was the more abundant of the two. They were not noticed until the middle of August and they did no appreciable damage to crops. The Asparagus Rust (*Puccinia asparagi,* DC.) was reported from three or four places and was particularly injurious on some two-year old plants grown from seed at Ottawa. Mr. J. A. Balkwill reports that there was hardly any at London, Ont., in 1900, but that it increased to a marked degree last summer.

The Zebra Caterpillar (*Mamestra picta,* Harris).—The autumn brood of this caterpillar was remarkably abundant at Ottawa during September and October last, and caused considerable damage in gardens to many kinds of plants. The caterpillars were also destructive in fields of fodder rape and turnips. Clover and lucerne were also attacked, but the growth of these crops was so heavy that the loss was seldom noticed. In gardens, cabbages suffered a great deal, and, although they did probably little harm at the time of year they occurred, the caterpillars were extremely numerous on beets and asparagus. In the flower garden the greatest loss was in late flowering Gladioli. The eggs are laid in clusters of about 150. At first the caterpillars are gregarious in habit, and many spikes of flower buds would be destroyed by a brood of caterpillars before their presence was detected. When half-grown, these caterpillars separate and wander in all directions, attacking almost all kinds of vegetation. The full grown caterpillars are very conspicuous and very gaily coloured. They are two inches long, velvety black on the back, with two golden yellow stripes connected by narrow white wavy lines along the sides. The head and legs are bright reddish brown. When full grown these caterpillars spin slight cocoons just beneath the surface of the ground, and the moths fly in the spring and in August. They are rather dull-coloured, purplish-brown moths with white underwings and expand about 1½ inches across the opened wings.

The Squash Bug (*Anasa tristis,* DeG.), known locally as 'Bishop Bug' in western Ontario.—This troublesome and destructive insect was the cause of frequent complaints in western Ontario, from growers of all kinds of plants belonging to the Gourd family, such as squashes, melons and cucumbers. Mr. J. B. Spurr, of Toronto, a large grower of melons, who suffered considerably, reports, August 23 : 'Squashes are very scarce on the Toronto market on account of the prevalence of the Squash Bug this year.' He made the interesting observation that on his grounds, when plants were attacked by the Squash Bug, they were not injured by the Striped Cucumber Beetle, and also that, when plants were attacked by the latter, they escaped the injury from the Squash Bug. This bug is very rare indeed at Ottawa. Twenty years ago, two specimens were taken here by Mr. W. H. Harrington, and none were seen since, although looked for carefully, until the past season, when a few specimens were taken. At Montreal Mr. M. Waring Davis reports considerable injury from the insect this year. Prof. Lochhead writes : 'These bugs were decidedly injurious in most localities throughout western Ontario. All the old well-known remedies seem to have failed altogether in keeping them in check. In the College gard‑n it was decided to keep a watchful eye over the early Squash Bugs ; but, in spite of great care exercised in hand-picking and spraying, they seemed to increase.'

Remedies.—There is still need of a better remedy than those usually advised to prevent loss from the Squash Bug. In seasons of ordinary occurrence, hand-picking

and trapping can be used to good effect ; but, when the insects are in very large numbers, as was the case in some places last summer, all remedies seemed insufficient. The usual remedies are :

(1.) Hand-picking, early in the season, of the old bugs, when they first resort to the plants, and also of the easily seen egg clusters. This requires an inspection of the vines every day or two. The young bugs may be easily destroyed with a spray of kerosene emulsion, or of whale-oil soap. This work is made much easier if a few hills of the ordinary squash are planted among melons, cucumbers, &c., so that they appear above the ground about a week before the crop. The squashes being more attractive, the bugs collect upon them, where they may be destroyed easily.

(2.) Trapping.—This consists of placing, at intervals through the plantation, shingles or pieces of board, beneath which the bugs gather for shelter. By examining these every morning, many may be captured. In a season when the bugs have been abundant, all vines should be burnt as soon as the crop has been gathered. In this way, many of the insects in all stages of development will be destroyed.

THE STRIPED CUCUMBER BEETLE (*Diabrotica vittata,* Fab.).—The injuries to cucumbers and melons by the Striped Cucumber Beetle during the past season were exceptionally severe and extended over the greater part of old Canada. Mr. S. C. Parker, of Berwick, N.S., speaks of it as particularly troublesome in Nova Scotia. At Berwick very few squash or pumpkins survived. In his own case, he planted squashes and cucumbers three times, the first two plantings being eaten up entirely. Frequent mention of injury by this beetle is also made in the Nova Scotia Crop Report for November. The most apparent injury is that done by the hibernating brood of beetles which attack young plants early in the season, and a little later the flowers, as soon as they open. The larva is subterranean in habit. It is a slender, wormlike creature, white, with a dark head, which attacks the roots and bores inside the stems.

As with the Squash Bug, a perfectly satisfactory remedy has not been so far discovered. The treatment of the larvæ in the ground has proved impracticable, except on a small scale. The greatest success has been obtained by covering the young plants with a square of cheese cloth, kept raised by two flexible sticks crossed at right angles and with the ends stuck in the ground. The cheese cloth is held down easily by putting some earth on the edges. By the time the plants have grown so as to require the removal of the covering, many of the first brood of the beetle will have disappeared. As an insecticide, Paris green with land plaster (1 pound to 50) dusted over the plants has proved more effective than several others which have been recommended ; but when the insects are in very large numbers, the plants are gradually eaten up, although large numbers of the beetles are destroyed. Other remedies which have given satisfaction in years when there was not excessive abundance of the beetles, are land plaster or ashes impregnated with coal oil or turpentine, scattered in small quantities on each hill. Tobacco dust from cigar factories, when obtainable, acts as a repellant to the beetles and also as a fertilizer. Pyrethrum powder is deadly to the beetles, but requires frequent renewal.

POTATO PESTS.

The potato crop has been very uneven ; and good crops were exceptional. Small crops were, I think, chiefly due to climatic conditions. In some parts of British Columbia, as down the Okanagan valley, many plants in a field would turn yellow and wither without any apparent cause, which would account for the death of the plants. The tubers in most cases were small but free from disease, and the leaves and stems showed none of the well-known fungous diseases. The hot, dry weather of

midsummer in eastern Canada was credited with a considerable shortage in the crop, but in some parts of western Ontario it is particularly noted that the potatoes put in late have yielded well.

The Colorado Potato Beetle has been very destructive in many places and was particularly abundant in Nova Scotia and Prince Edward Island, where the potatoes were not sprayed with Paris green or other poison. In Manitoba and the North-west Territories at a few points some injury was done by the Black Blister-beetle (*Epicauta Pennsylvanica,* DeG.). As is usually the case, however, the visitations were of short duration. I was informed by the Hon. R. P. Roblin of one instance in which a considerable swarm of these beetles on a neighbour's farm was cleared from a potato patch by a flock of 25 or 30 chickens. No ill effects to the chickens were noticed, which seems somewhat surprising. The Black Blister-beetles were abundant on potato patches in the city of Winnipeg and were attracting much notice during the first week of July, but had all disappeared before the middle of the month.

The Striped Blister-beetle (*Epicauta vittata,* Fab.).—Another beetle which this year has shown up far more abundantly than is usually the case is the Striped Blister-beetle, of which specimens have been sent in from a few places in western Ontario, as injurious to potatoes, tomatoes, mangels and beets.

Fig. 9.—The Striped Blister-beetle.

'Queenston, Ont., July 20.—I send you some striped beetles from a neighbouring farm. They are destroying tomatoes, potatoes, &c. These insects are very wary, and are gregarious in habit.'—W. O. Burgess.

'Cedar Springs, Ont., July 21.—I send specimens of a kind of beetle which is destroying my mangels. They come in swarms and eat the leaves. There are beets in the same patch, but they have not touched them yet. Do you think they will?'—Wm. Clayton, Sr.

'Stromness, Ont., Aug. 10.—Please find inclosed beetles that are eating up beets, potatoes and tomatoes. They are in gardens in swarms, and you can drive them like sheep. They are voracious eaters, and have nearly destroyed our beets. We sprayed them with Paris green, and it appears to have killed them. What are they ? I never noticed them until this summer. Please give me some information on the subject.'—Henry E. Dickout.

The Striped Blister-beetle is a narrow, soft-bodied beetle about half an inch in length, with blackish wing-cases, each of which is margined with yellow and has a yellow stripe down the centre. The head and thorax are also dark, with yellow markings. The legs are long and slender, and the beetles are, as mentioned above, extremely active, flying readily from their food plant when approached. This habit is of much use in preventing these Striped Blister-beetles from destroying crops.

Like all the rest of its family, this species, in the larval form, is a predaceous parasite on the eggs of grasshoppers. It is, therefore, undesirable to destroy the beetles if this can be avoided. As is the case with nearly all leaf-eating insects, this one can be destroyed by spraying the crops with a poisonous mixture, such as Paris green and other arsenites. Prof. Webster found that Bordeaux mixture sprayed over plants kept these beetles away, and that they could be readily killed if whale-oil soap were sprayed on them. Owing, however, to the readiness with which they take flight when approached, an operation known by the name of 'driving' has been adopted in those parts of the United States where this species occurs, and where it is far more abundant than has ever been the case in Canada. In my experience, this insect has been very seldom mentioned as a crop pest in the Dominion, and it is worthy of remark that considerable injury was done by grasshoppers to crops in that part of Ontario, from which the above reports were received. 'Driving' consists simply of several people walking across an infested field with branches, or other conspicuous objects in their hands, waving them from side to side and driving these easily disturbed beetles ahead of them until they come to the edge of the crop, where they will disperse and seldom return. A character which is often noticed with these beetles is that they appear in large numbers suddenly, which is due to the fact that the larvæ

do not feed on vegetation, and the beetles, when mature, fly to the fields in swarms to feed. The crops which are most generally attacked are mangels and beets, but tomatoes and potatoes are also attacked. A satisfactory feature, too, is that a swarm seldom remains for any considerable length of time in any one field.

THE CUCUMBER FLEA-BEETLE (*Epitrix cucumeris*, Harr.).—This minute beetle, which does not exceed one-twentieth of an inch in length, is black, covered with short fuscous hairs, and is much more frequently complained of as a potato pest than as an enemy to any other crop. It is sometimes, in hot dry summers, one of the worst enemies of the potato, eating many small holes through the leaves and reducing them so much that they are unable to perform their functions. Reports of injury have been received from Vancouver Island and several places in Ontario. The best remedy for this insect appears to be spraying the vines with Bordeaux mixture. This treatment has given far better results than spraying with Paris green. The practice, too, of spraying potatoes with Bordeaux mixture is also an excellent one, as being an effective preventive of the Early Blight of the Potato, as well as of the much more destructive Potato Rot or Late Blight.

THE FIVE-SPOTTED HAWK-MOTH (*Protoparce celeus*, Hbn.).—The large caterpillar of this moth, known as the Tomato Sphinx, is frequently found in some numbers upon tomato vines, but its work is so conspicuous and the tomato makes such rapid growth that its injuries are very seldom important in Canada. However, the caterpillar feeds on many other plants belonging to the Nightshade Family, such as the potato and tobacco. It is frequently the cause of considerable loss in the large tobacco fields in the county of Essex, where it is generally spoken of as the Tobacco Worm. This name, however, belongs properly to an allied species, *Protoparce carolina*, Linn., which occurs very rarely in Canada. Prof. Lochhead, of Guelph, writes : 'The Tomato Sphinx was very abundant in 1901 on tomatoes, potatoes and tobacco. In fact, it was no trouble to gather hundreds of specimens of the large worm in a few hours.' During the past summer some reports were received from western Ontario of injury to potatoes by the caterpillars of the Five Spotted Hawk-moth. The potato, however, must be considered an exceptional food plant and the insect is not likely to become a regular pest of that crop.

THE POTATO-STALK WEEVIL (*Trichobaris trinotata*, Say).

During the past summer, another insect has been added to our Canadian list of crop pests. Prof. Lochhead writes to me as follows :—

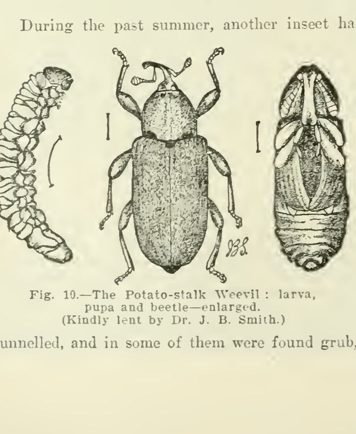


Fig. 10.—The Potato-stalk Weevil : larva, pupa and beetle—enlarged. (Kindly lent by Dr. J. B. Smith.)

'In September I received from Mr. J. A. Auld, M.P.P. for South Essex, specimens of potato vines which were completely destroyed by the Potato-stalk Weevil, and he reported that this insect was very prevalent in Pelee Island. Last year, he said, the island exported 30,000 bushels of potatoes, but this year it will have no more than enough for itself, and none to spare. It is almost impossible to tell the presence of the insect in the vines until they commence to wither and die. The vines sent me were badly tunnelled, and in some of them were found grub, pupa and adult.'

The Potato-stalk Weevil is a small, slaty-gray, oval beetle about ¼ inch long, with a black head and beak. There are also three distinct black spots across the shoulders. The injury is done by the grubs, of which from one to five may be found during July and August in the stems of infested potatoes, the centre of which they have eaten out. The oval white eggs are laid by the females in slits which they make with their beaks in the base of the stem. The eggs soon hatch, and by about the middle of August the soft, yellowish white, legless and wrinkled grubs with brown, horny heads are full grown. These, like most weevil larvæ, lie in the stem in a curved position. Where there are several of these grubs, most of the central part of the stem is eaten, the leaves turn yellow and the stem dies prematurely ; but, when only a single larva occurs, little harm is done. When full grown, the grubs usually work their way down to the base of the stalk and form white cocoons of fibres gnawed from the stem. The pupa state is of short duration. The beetles mature in August and September, but they pass the winter in the cocoons, and do not emerge until the following spring.

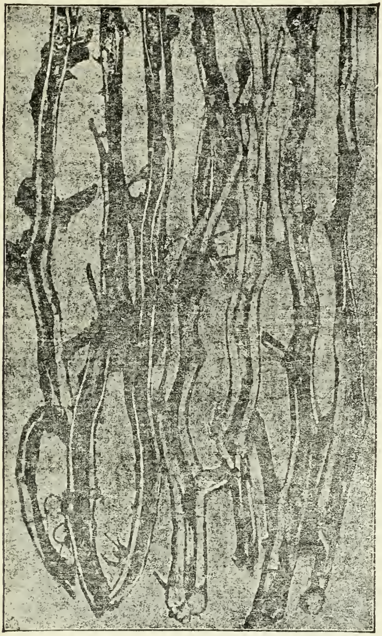


Fig. 11.—Potato vines eaten out by the Potato-stalk Weevil—somewhat reduced. (Kindly lent by Dr. J. B. Smith.)

The Potato-stalk Weevil has never before been recorded from Canada as a serious enemy, but in several of the United States it has occurred intermittently, and has done much harm for a year or two and then suddenly disappeared. It was treated of by Dr. Thaddeus Harris fifty years ago as a potato pest in Pennsylvania. Since that time several of our American practical entomologists have mentioned it in their writings.

Remedy.—From the fact that the perfect beetle passes the winter in the dead stems of the plants it has attacked during the summer, an easy and effective remedy is to destroy all vines as soon as they are seen to be infested or as soon as the potatoes are dug up. The advantage of promptly destroying with fire all haulms, tops, vines, &c., of such crops as have been taken in, cannot be too strongly advised. Not only is untidy or objectionable litter thus removed and turned into useful fertilizing elements, but many injurious insects and fungous diseases are done away with, which would endanger the crop of the following year. This is particularly the case with the potato, the most destructive disease of which, the Potato Rot, propagates in the leaves

and stems which are frequently left lying about the field after the crop is dug or are piled on the top of the tubers before these are bagged.

As far as is known, this beetle feeds only on plants of the Nightshade Family, which is sparsely represented both in our native and cultivated flora. Wild plants of the thorn-apples, *Datura Stramonium,* and *D. Tatula,* as well as the wild Solanums should also all be destroyed whenever they are found growing near crops of potatoes in a district where the Potato-stalk Weevil has appeared. Prof. J. B. Smith recommends that, if the presence of the larvæ is noticed in the fields, the plants should be stimulated by the application of appropriate readily soluble fertilizers, so that the vines may be able to mature the crop despite the attacks of the weevil.

THE VARIABLE CUTWORM (*Mamestra atlantica,* Grt.).

For the last three years the moths of this species have been extremely abundant at Ottawa ; and at other points in Ontario and Quebec their abundance has been noted by collectors of insects. During the past summer this moth was one of the commonest species at Ottawa around electric lights. As it is only of late years that the insect has become prevalent in the Ottawa district, and in view of the remarkable increase in its numbers, it seems not improbable that it may at some time develop into a pest of some importance. Occasional specimens of the caterpillars have been found in vegetable gardens, but as yet no reports have been received of their having done harm to any cultivated crop.

During the past season a cluster of eggs of this moth was found upon the European Honeysuckle (*Lonicera caprifolium,* L.), and the larvæ were reared to maturity and notes taken on all the stages. The larvæ were fed to various low plants, chiefly plantain, dandelion, &c., and passed through seven stages before entering the earth to pupate. The eggs were found on June 6 and had probably been laid two or three days, the first caterpillar hatched June 10, and the perfect moth emerged July 17—a life period of 37 days.

As to whether there is more than one brood in the year, is a question which requires further light. From the data at hand it is just possible that there are two broods at Ottawa. Moths have been taken as early as May 22, and from that date commonly until June 28, then again from July 31 to August 25. Those reared from eggs during the past summer emerged from July 17 until August 1. A nearly full grown caterpillar was found on October 19 in the earth, near a row of beet-roots, apparently hibernating, about an inch below the surface. On the day previous to this, another specimen which was parasitized was found in the same place on the Experimental Farm. Many of the brood of caterpillars reared from the egg, which pupated in July, are hibernating in the chrysalis state. Mr. C. H. Young, of Hurdman's Bridge, near Ottawa, also found out of doors in the fall of 1900 a pupa which gave the moth the following spring. It may be, therefore, that there are two broods of this insect in the year, namely, as follows : those which emerge in spring in May and June, either from wintered pupæ, or from larvæ which have hibernated nearly full grown and then pupated early in spring, and those which emerge in late July and during August, being from eggs laid by the moths of May and June, as in the case of those reared the present summer. The larvæ found in October are doubtless from eggs laid by the moths which fly in late July or in August. The second brood, however, may, as in the case of those reared this year, be only a partial brood, as about half of those reared emerged from July 17-August 1, the remainder wintering over as pupæ. It is possible too that the larvæ reared in confinement this year inside a building and during unprecedentedly hot weather may have emerged sooner than was natural.

The general appearance of these caterpillars may be described as follows :—The ground colour of the body which varies remarkably in different specimens of the same brood, ranges from yellowish-green, through a dull yellow ochre, a ruddy brown, to a dark umber brown. The markings may be described as minute mottlings, dots and

streaks aggregated on the dorsal area into a regular pattern consisting of a medio-dorsal continuous band, with a pale disconnected narrow line in the centre, and two lateral less connected stripes also centred with a pale thread and of about the same intensity as the medio-dorsal band. The space between the lateral stripes is closely speckled with black dots. The stigmatal stripe is black, narrow and distinct, and close beneath it is a wide conspicuous yellow substigmatal band with the ground colour showing through it in places. The ventral surface is slightly paler than the dorsal. The head is honey yellow, mottled with darker markings.

The caterpillars of *Mamestra atlantica* being cutworms, if they should ever become abundant, the ordinary remedies for cutworms may be used.

The moth of *Mamestra atlantica*, Grt., is a pretty grayish brown species with the fore wings mottled with darker brown blotches and shaded with ruddy brown or gray. The costal area which reaches to and includes the orbicular spot is distinctly grayish, the lower wings fuscous. The subterminal line which bears the W-shaped mark of the genus is white and narrow, very distinct, by reason of a dark shade between it and the margin. Superficially *M. atlantica* will be thought by the ordinary observer to bear a decided resemblance to *M. subjuncta*, G. & R. Prof. J. B. Smith has very kindly drawn me up the following memorandum describing the differences between *M. atlantica*, the closely allied *M. nevadæ*, Grt., and *M. subjuncta*. In addition to what Prof. Smith has noted, I may add that, from the examination of a large number of specimens caught in the field and several others reared from the egg in confinement, I find a very constant difference in the form of the subterminal line. In *subjuncta* this line sweeps in a gentle curve behind the apical patch and coming forward joins the base of the W-shaped mark, whereas in *atlantica* it strikes inward from the costa behind the apical patch in a straight line and then runs out again at a sharp angle beneath it. The apical patch in *subjuncta* is hardly traceable, while in *atlantica* in many specimens it is strikingly paler than the rest of the wing around it.

Notes on Mamestra atlantica, Grt., *M. nevadæ*, Grt., *and M. subjuncta*, G. & R.

Mamestra subjuncta differs at once from *atlantica* and *nevadæ* by the longer, narrower primaries, in which the anal angle is distinctly retracted. In ornamentation the obvious difference is a narrow black line extending from the end of the claviform to the t. p. (transverse posterior) line in *subjuncta*, which is wanting in both the others.

As between *atlantica* and *nevadæ*, the differences are equally great in general appearance, but more difficult to locate and define.

Atlantica is somewhat smaller, much brighter in colour, the costal region tends to become lighter throughout and the transverse lines obscure. The orbicular is oblique, narrow, elongate, the claviform narrow and pointed at tip. There is no suggestion of *subjuncta* in appearance.

Nevadæ has an obvious resemblance to *subjuncta* and hardly recalls *atlantica*. The colour is darker, the costal region is not contrastingly brighter, the orbicular is round or oval, and the claviform is short, broad and not pointed. The male organs differ markedly. See Proc. U.S.N.M. xiv., pl. viii. ff. 20 and 23 for *atlantica* and *subjuncta*. Those of *nevadæ* exaggerate the *atlantica* characters.—JOHN B. SMITH.

FRUIT CROPS.

The fruit crop of Ontario during the past season has been a very remarkable one. For the greater part of the province apples may be said to have been a failure, but in the northern counties and up through Muskoka, Manitoulin and Algoma, wherever

apples are grown, excellent crops were reaped. Plums and pears have been full crops, although the former were considerably injured in some places by aphis. In western Ontario sweet cherries were very short and the trees suffered greatly from the Black Aphis. Mr. W. S. Blair tells me that this was also the case in Nova Scotia. After the San José Scale, probably the worst enemies of the fruit grower in Ontario this year were the Cankerworms. Prof. Lochhead reports that the Cigar Case-bearer is becoming more serious every year, which he believes is due to early spraying not being attended to.

In the province of Quebec the crop was rather light, but the quality of the fruit was good and realized high prices ; this was markedly the case where attention had been given to spraying, Mr. R. W. Shepherd, of Como, a large buyer of choice apples for the British market stating unequivocally that he could only obtain first-class fruit fit for the above purpose from orchards which had been regularly sprayed.

In Nova Scotia the crop has, on the whole, been a very satisfactory one. Fruit was of good quality and the prices remunerative. Prof. Sears of the Nova Scotia School of Horticulture, says :—'The apple crop was peculiar. Perhaps never before has a finer, fairer crop of fruit been produced, but while one section is blessed with a remarkably abundant crop, another, not more than four or five miles distant, is a very light one ; doubtless, methods of culture, spraying and fertilizing are to a large extent responsible for this.'

In British Columbia the fruit crop has been a satisfactory one. Plums were abundant and there was not much complaint of disease. Apples were a heavy crop in some places but light in a few others. The quality was excellent and higher prices than usual were secured. The markets in the Kootenays, North-west Territories and Manitoba have been opened up and car-load shipments have been going forward since the beginning of the season. Mr. R. M. Palmer anticipates that there will be a very largely increased acreage in fruit next year. There was no very serious injury reported to fruits in British Columbia. Strawberry beds near New Westminster and around Burnaby were to some extent injured by the larvæ of the Black Vine Weevil (*Otiorhynchus sulcatus*, Fab.). The Imported Currant Borer (*Sesia tipuliformis*, Linn.) is reported by Mr. W. A. Dashwood-Jones as very bad this year all over New Westminster city. Another enemy which is injuriously prevalent in Vancouver Island and at the mouth of the Fraser river is the Currant Maggot (*Epochra canadensis*, Loew.). This insect attacks all kinds of currants and sometimes gooseberries. During the past summer it also occurred in noticeable numbers at Edmonton, Alta., Winnipeg, Man., and one or two places in Nova Scotia. Plant-lice were troublesome on apple and plum trees in British Columbia.

As is the case every year, many of the well known pests of the orchard have levied a heavy tribute in some localities, particularly where spraying and cultivation have been neglected.

THE CODLING MOTH (*Carpocapsa pomonella*, L.—Mr. Linus Woolverton, Secretary of the Fruit-Growers' Association of Ontario, writes that 'the Codling Moth is still the terror of the apple-growers. It is a most serious enemy, and, if you can give us any later information with regard to the best method of destroying it we should be very glad.' Mr. Parker, Secretary of the Fruit-Growers' Association of Nova Scotia, and Rev. Father Burke, of Alberton, P.E.I., both write in very much the same strain ; but the two last correspondents also drew attention to good results where spraying has been carefully attended to. Where there is only one brood of this insect, as in eastern Ontario and from there to the seaboard, spraying after the blossoms have all fallen and the young apples have begun to form is undoubtedly the best remedy. Two sprayings, at least a fortnight apart, should be given. In western Ontario this must be supplemented with banding the trees from the middle of June. Burlap is the best material to use for the bands, and careful search must be made beneath them at short intervals to destroy the cocoons. These are sometimes rather difficult to detect as the larvæ burrow down somewhat into the surface of the bark and cover the cocoons with

the debris. The Hazeltine moth trap, so much advertised, has not given good results.

Fig. 12.—Twig infested with Oyster-shell Bark-louse.

The Oyster-shell Bark-louse (*Mytilaspis pomorum*, Bouché, = *M. ulmi*, L.) is still a persistent enemy in all parts of the country, and attacks many kinds of trees and shrubs. The remedy is spraying when the young emerge in the first week of June in Ontario, and as late as the third weeek in June in the Maritime Provinces, with kerosene emulsion or whale-oil soap. Spraying infested trees with a wash made by dissolving 1 lb. of concentrated lye in from 3 to 6 gallons of water, which is frequently recommended, has not given me satisfactory results in controlling the Oyster-shell Bark-louse. Mr. Macoun, the Horticulturist of the Central Experimental Farm, has been very successful in clearing the apple orchard at Ottawa from this troublesome pest by spraying with a lime wash and at the same time giving high cultivation to maintain the fertility of the soil and invigorate the trees. He sprayed the trees in autumn or early in winter with a whitewash made with one or two pounds of fresh lime to each gallon of water. As soon as the first coat had dried, a second one was applied. During the winter the lime flakes off the bark and carries with it the scales which have previously been loosened by this alkaline application

Cankerworms (*Anisopteryx*).—These caterpillars have been very destructive in western Ontario in 1901. Mr. George E. Fisher considers them among the worst pests of the season. Mr. Woolverton speaks of them in the same terms. Orchards have also been defoliated in Quebec and Nova Scotia. The remedies for these insects are early spraying, just after the blossoms have all fallen, and banding threatened trees in autumn and spring, with one of the mechanical tree protectors or with adhesive mixtures, either directly on the trees or on bands of coarse paper tacked closely and firmly around the trunk. For spraying, 1 lb. Paris green, 1 lb. fresh lime and 160 gallons of water will answer, and, if applied while the young caterpillars are small, will destroy them surely. The method of applying the adhesive mixture is explained fully in my report for 1895. The best mixtures are (1) printers' ink, 5 lbs. and fish oil, 1 gallon, which will treat about one acre of orchard. (2) *a*. For cold weather, castor oil, 2 lbs., common resin, 3 lbs. *b*. For warm weather, castor oil, 2 lbs., resin, 4 lbs. Heat slowly until the resin is all melted and apply warm. (Mr. O. T. Springer's receipt.) Mr. George E. Fisher, of Freeman, uses practically the same materials but prepares them rather differently. He says : 'For use against the Cankerworm in warm weather I use castor oil and resin (5 lbs. of resin and 3 lbs. of castor oil, and in cold weather, equal parts of all by weight). A little experience is necessary to determine just what proportions will suit the prevailing weather conditions, but they will vary between these limits. The rough bark should be carefully removed at a convenient height before applying the mixture. The first application will not remain sticky very long, being appar-

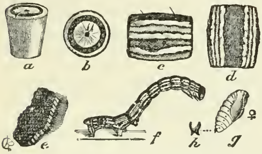


Fig. 13.—The Fall Cankerworm ; *a*, egg ; *b*, end view of egg ; *e*, mass of eggs ; *f*, caterpillar ; *c*, *d*, segments of *f* ; *g*, pupa of female—*a*, *b*, *c*, *d*, enlarged.

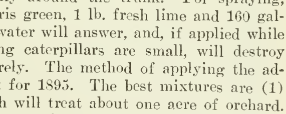


Fig. 14.—The Fall Cankerworm ; *a*, male moth ; *b*, female moth ; *c*, joints of antenna of *b* ; *d*, abdominal segment of *b* ; —*c* and *d*, enlarged.

ently absorbed by the bark, and a second may be necessary in about a week. This will keep fresh a good while, and is certainly a good trap for Cankerworms in either the moth or caterpillar stage. We have taken as many as 250 females on a single small plum tree. The cost of this sticky bandage and of putting it on several times amounts to a considerable sum, where many trees are involved. I am thinking of trying a collar made of tar paper.'

TENT CATERPILLARS (*Clisiocampa*).—Nearly all correspondents, except those from south-western Ontario, report a conspicuous absence during the past summer of Tent Caterpillars. Considerable harm, however, was done in the Niagara Peninsula, and along the north of Lake Erie. Mr. L. Woolverton writes : 'The Forest Tent Caterpillar is committing great ravages in orchards bordering upon woods. They come in great numbers from native trees to the orchards, and are very destructive and difficult to check.' When upon orchard trees, spraying with the ordinary Paris green mixture is the best remedy for Tent Caterpillars, but, at the time they spread from woodlands to adjoining orchards, they are as a rule nearly full grown. In this case, mechanical tree protectors or loose bands of cotton batting will probably be the most satisfactory way of keeping them off the trees.

APPLE-TREE BORERS (*Chrysobothris femorata*, Fab., and *Saperda candida*, Fab.).—The recognized methods of fighting these enemies of the apple-grower, are the application of washes to the trees to prevent the females from laying their eggs, and the digging out of the larvæ in the autumn and spring, when indications of their presence are observed. Although both of these old remedies are good ones, and in many instances all that are required, there are occasionally found localities where these insects are in such numbers that some other and better remedy is still a desideratum. Mr. Francis S. Wallbridge, of Belleville, Ont., has an orchard which is situated in one of these localities where the borers seemed to defy all efforts to control them. The orchard is a young one, has received every care, and many experiments have been tried to clear it of these insects, but with little effect. It seems, therefore, necessary to try more experiments before we can claim to have a practical remedy against Apple-tree Borers. I shall be obliged if fruit-growers living in the districts infested by the San José scale will report to me whether whale-oil soap and crude petroleum, now used to a considerable extent on apple trees for the destruction of the San José Scale, do not also prevent attack from the Apple-tree Borers. A series of experiments has been planned with various mixtures containing carbolic acid, which will be reported on later. Fig. 15 shows the Flat-headed Apple-tree Borer (*C. femorata*) twice the size of nature.

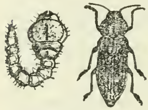


Fig. 15.—The Flat-headed Apple-tree Borer : larva and beetle—enlarged.

THE ROSE CHAFER (*Macrodactylus subspinosus*, Fab.).—This troublesome beetle, which every year does so much harm to the flowers of grape vines and to young apples, has this year been rather abundant in the Niagara district, attacking apples and peaches. Mr. H. Gordon Ball, when sending specimens, at the end of June, wrote : 'I think that in one peach orchard they have destroyed from 15 to 20 per cent of the fruit, and this year the trees require all the peaches that form to make a good crop. These beetles do not seem to eat the leaves or anything but the fruit. A wild-grape vine along the fence seemed to be alive with them. The beetles fly around the trees readily, but, when touched, they are more apt to fall to the ground than fly. Many of the peaches, when bitten by the beetles, fall off.' As has been frequently observed, the Rose Chafer is an extremely difficult insect to destroy with poisons, and a satisfactory remedy has long been wanted. Although very active during the hot hours of the day, the beetles are sluggish early in the morning, and are fond of congregating in numbers on trees upon which they feed. Many may, therefore, be

Fig. 16.—The Rose Chafer —life size.

destroyed by beating these trees over a collecting net or an inverted umbrella, to be afterwards emptied into some vessel containing water, with a little coal oil on the surface. The beetles seem to be particularly fond of certain varieties of grapes, as for instance the Clinton. When this is known, the usefulness of planting a few vines of this variety in a vineyard as a trap is apparent. These will act as decoys upon which the beetles will collect and from which they may be easily beaten and destroyed. The rose tree, in all of its varieties, and the blossom of the rhubard are also very attractive, and may be planted so as to draw off the attack from fruit trees. Prof. Webster has made the discovery (Proc. Ass'n Econ. Ent. 1899, p. 70) that 95 per cent of the adult beetles may be killed by spraying them with half a pound of fish-oil soap in a gallon of water. The suds must be thrown directly on to the beetles while they are clustered on the blossoms of the decoy plants, but spraying trees with the soap has no effect in keeping the beetles off afterwards.

Among less known injuries to fruit crops which have been reported during the past season, mention may be made of the following :—

Click Beetles (*Elateridæ*).—The food habits of these beetles are somewhat various. Although, as they are the perfect state of wireworms, which are so destructive to all classes of vegetation, they must be considered among the worst of injurious insects, yet they have been occasionally caught in the act of feeding on plant-lice. Many kinds of Click Beetles are found on flowers, and complaints of extensive injury to apple and pear blossoms have been received concerning two species, namely, *Corymbites tarsalis,* Melsh., and *C. caricinus,* Germ. During the past summer specimens were received from Mr. M. Young, of Gardenville, Ont., of another species not previously recorded as a fruit enemy, i.e., *Corymbites cylindriformis,* Hbst., with statement that they had bitten plums, apples and other fruits. Mr. C. W. Nash, of Toronto, also forwarded specimens of the same species for name, which had been sent to him as depredators on the flowers of apples.

The Blackberry Soft-scale (*Lecanium Fitchii,* Sign.).—A remarkable outbreak of this scale insect occurred at Trenton, Ont., ample specimens of which were sent to me by Mr. John D. Evans, who stated that about eight acres of blackberries in different orchards were covered with the scales from about a foot above the ground to the top, and that the injury was chiefly on old plantations, probably ten or twelve years old. A young plantation at some little distance was very little affected. The examination, later in the season, of the material received from Mr. Evans revealed the fact that the scale insects were severely infested by parasites : A fungus, a species of *Cordyceps,* two species of small lady-bird beetles, *Hyperaspis proba,* Say, and *H. signata,* Oliv., and no less than six species of hymenoptera, *Encyrtus fuscus,* Howard, *Aphycus annulipes,* Ashm., *Coccophagus flavoscutellum,* Ashm., *Blastothrix* sp., and *Microterys* sp., all in large numbers, and, as well as these, a single specimen of a very interesting minute Proctotrypid *Eutochus xanthothorax,* Ashm., of which Mr. Ashmead, when kindly naming the above specimens, says : 'A Mymarid described fifteen years ago from Florida. (Can. Ent. XIX., 1887, p. 193.) This is the second specimen seen.' Nearly all of the same parasites were reared in equally large numbers by Mr. Evans from part of the same material collected at Trenton.

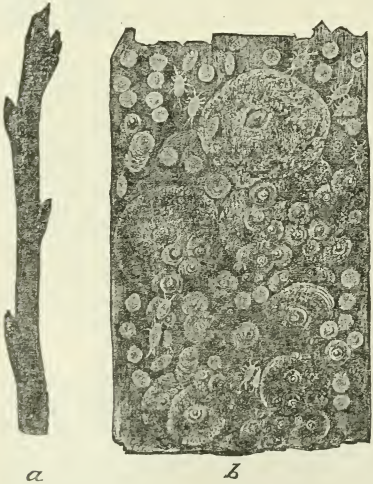
The Plum Gall-mite (*Cecidoptes pruni,* Am.).—A very unusual but rather serious injury was discovered last winter by Mr. Geo. E. Fisher, at Queenston, Ont. This was due to the small mite named above. Mr. Fisher says : 'The galls are plentiful in this one orchard at Queenston. I have not noticed them anywhere else.' In June last, Mr. Carl E. Fisher, of Dulverton, Queenston, also sent specimens, reporting that it occurred only on one of his own trees, but that he had seen it frequently on Common Blue and Red Egg plums in Queenston village. He feared that it might become a serious disease. In Europe this mite occasionally becomes a pest of some importance.

The small, shot-like galls are produced on young twigs, usually on old trees, but they have also been observed by Dr. L. Kirchner on young and healthy plants, whose death they caused. (Andrew Murray, Aptera, p. 363.)

THE PEACH BARK-BEETLE (*Phlœotribus liminaris*, Harr.).—This little bark-beetle although it only occurs in Canada, as far as I am aware, in the Niagara Peninsula, is there every year the cause of much injury to peach trees. Mr. Carl E. Fisher has for several years experimented with remedies and has kept it measurably under control. During the past season he has tried washing the trees with a strong solution of whale-oil soap, and the results are so satisfactory that I have much pleasure in making them public for the benefit of others who are troubled with this pest. Mr. Fisher writes : 'Regarding the Peach Bark-beetle, it is still a bad pest. I can see signs of it in many of the orchards throughout this section. The best remedy I have found yet is three pounds of whale-oil soap in one gallon of water, applied in the early spring, when the beetles first begin to move, and two or three times afterwards, if it is considered necessary from an examination of the tree during the summer. This is much easier made up than the formula I sent you some time ago. (Rept. Ent. and Bot., 1896, p. 225.) It is fully as effective, or more so, and of course will not injure the tree. Applied with a stiff scrubbing brush, the work is easily done.'

THE SAN JOSE SCALE.

The San José Scale is still a subject of enormous importance in that part of Ontario where it occurs. Fortunately, it does not exist in any other province of Canada, and during the past season it has spread but little beyond its former limits, but within these a great deal of harm has been done in many orchards within the area where it has secured a footing. This insect was not detected in Ontario orchards until January, 1897, and certainly was not at that time abundant in any part of the province. All statements that the insect has been in the country for ten or more years are, as far as I can find out, mistakes, or are founded on conjecture. In different localities the degree of injury to trees from this insect varies very much, but in all places, when once established, it spreads rapidly, and by the second year the trees may be coated over by the scales and rendered so unsightly as to be readily detected. Trees in this condition are always seriously injured, and, although with careful treatment they may be saved, it is usually questionable whether this is good policy, and whether it would not be better to cut down the trees and replant.



a b

Fig. 17.—The San José Scale : *a*, infested twig ; *b*, part of the same, much enlarged. (Cut kindly lent by the U. S. Entomologist.)

Owing largely to the excellent work which has been done by Mr. George E. Fisher, the Inspector of San José Scale for the province of Ontario, and also by Prof. F. M. Webster, in the State of Ohio, just across our borders, where the conditions are identically the same with ours in Ontario, fruit-growers are at last beginning to appreciate how important a matter it is for them to take measures to control this terrible pest as soon as they become aware of its presence on their trees. The outlook at the present time, as far as the San José Scale is concerned, seems more hopeful than it has ever been since the first announcement of its occurrence in Canada. Every effort has been put forth by the federal and provincial governments to protect fruit-growers and others from further importations of the scale, and at the same time a great deal of work has been done in distributing information through printed reports and bulletins, through addresses at public meetings, and through the agricultural press, to explain to all likely to suffer from the ravages of the insect how to recognize it, what its habits are, and what can be done to keep it in check. Extensive experiments have been tried, particularly by the officials of the Ontario Government, with all the remedies which from time to time have been suggested, and, as an outcome of all the work done in Ontario and the United States, it may now be reasonably claimed that we have three practical remedies against this worst of all known fruit pests, which are, at any rate, as effective against it as many remedies which are used with satisfaction against other injurious insects.

Injurious Nature of the San José Scale.—A vain hope which was entertained by fruit-growers in Ontario, was that all parts of Canada were too far north for the San José Scale to increase and spread to the injurious extent of killing trees. It was known that in the Southern States trees had been killed in two or three years. Some claimed that the scale had certainly been introduced into Canada for several years longer than was believed to be the case by entomologists, and as no trees had been found to have been killed by it, they thought that the danger from this insect had been overestimated by those who had studied it carefully, and that in Canada the scale would not kill trees outright in the same wholesale manner as it did in the Southern States. The experience of the past season, however, in many orchards which I have visited this autumn, at Niagara, St. Catharines, Chatham, and Guilds, near Blenheim, Ont., entirely disposes of any doubt on this score. Several trees were seen which had only been attacked for two or three years, but which were quite dead, and a great many more which, although they had not been actually killed outright, were so seriously injured that they were practically useless. I anticipate that very few of these will survive the winter. The kinds of trees which had been most injured were peach, plum, and pear, in the order mentioned ; even apple trees, which are known to resist the attack of this insect longer than other fruit trees, were found dead in some orchards which had been known to be infested for only two or three years. Others were found very seriously injured, many of the lower branches being quite dead. Some varieties of apples, and indeed of all other fruit, are more susceptible to injury from the San José Scale than other kinds are. The Rhode Island Greening seems to have small power of resistance among the best known commercial varieties of apples, and the fruit shows the presence of the scale much more conspicuously by the red blotches which are caused on the green skin, wherever they have been attacked. Among plums, the Japanese varieties suffer most. 'Of peaches, Crawfords and varieties of that type are the most susceptible. Bartlett pears are probably most affected, and Kieffers certainly least.' (G. E. Fisher.)

Rapidity of Increase.—As an instance of the rapidity with which the San José Scale spreads, I may cite one large orchard, near Chatham, Ont., consisting of 70 acres, containing over 10,000 well-grown fruit trees of various kinds—apple, peach, pear and plum. This orchard has been well pruned, cultivated, sown with cover crops, and otherwise cared for. Two years ago, infested trees were detected at four or five points through the orchard. No efforts were made to destroy the scale, and, when I visited

the place in November last, the insect could be found in every part of the orchard. I have no doubt but that, unless some treatment is given the trees next season, serious loss will ensue. In another orchard of 1,600 peach trees, near Niagara, in August, 1899, seven experienced men spent six days in making a critical examination, and found only 87 slightly infested trees. In the season of 1900, this orchard bore a full crop of fruit, but the scale insect spread through the whole orchard and could be found on every tree. By the beginning of November, 1901, many of the trees were dead, and all practically so for any commercial purposes. This was a direct result of neglect, nothing having been done to rid the trees of their enemy. Many other instances might be given, but they all tell the same tale, that the San José Scale must still be considered, as it has always been claimed to be by entomologists, the pest most of all to be dreaded by fruit-growers. These latter, therefore, as a class, should do everything in their power to back up and help the Government in its wise endeavours to protect the country from further importations from abroad and from allowing the insect to increase in Canadian orchards. Every one can help in this matter, for it cannot be denied that the chief reason that this pest has done so much harm as it has, is because fruit-growers themselves, from not recognizing the gravity of the case, have not helped, or even, in some instances, have opposed the steps taken by the Governments to control it, and, moreover, have not, in their own orchards, applied the remedies which the latest experiments have proved to be the best.

Remedial Measures Taken.—It may not be amiss to recapitulate from my last annual report the restrictions under which, by the amended San José Scale Act, nursery stock may now be imported into Canada from countries where the San José Scale is known to occur. 'When it was discovered that this insect could be killed on nursery stock by fumigating with hydrocyanic acid gas, at the urgent request of many fruit-growers, horticultural societies, nurserymen and others, by instruction of the Minister of Agriculture, proper fumigating houses were erected in the spring of 1899 at such points on the boundary as it was thought would be most convenient to importers, and qualified superintendents were appointed to treat any nursery stock, trees, shrubs and other plants as might be imported through these ports, and then repack and send them on to their destination as promptly as possible. For this purpose, fumigating with hydrocyanic acid gas, using the formula recommended by the United States Entomologist for dormant stock, was adopted, it being the simplest effective formula, viz., one fluid ounce of commercial sulphuric acid, one ounce of refined cyanide of potassium (98 per cent), and three fluid ounces of water, to every 100 feet of cubic space—exposure 45 minutes. These fumigating houses were located at the customs ports of St. John, New Brunswick ; St. Johns, Quebec ; Niagara Falls and Windsor, Ontario ; Winnipeg, Manitoba ; and Vancouver, British Columbia. The whole expense of these stations was assumed by the Dominion Government, but all shipments were made entirely at the risk of the shippers or consignees, the Government assuming no risk whatever. The packages had to be addressed so as to enter Canada at one of the above-named ports of entry, and the route by which they were to be shipped, clearly stated upon each package.

'Many horticulturists and nurserymen availed themselves largely of this concession, and at every point much stock was imported from the United States and Japan. Nursery stock of all kinds can be imported from Europe without fumigation, as the San José Scale has never gained a foothold in European countries. Certain other plants which are not liable to the attack of the San José Scale are also exempted from treatment under the San José Scale Act. These are : (1) greenhouse plants, including roses in leaf which have been propagated under glass ; (2) herbaceous perennials, including strawberry plants ; (3) herbaceous bedding plants ; (4) all conifers ; (5) bulbs and tubers ; (6) cottonwood (*Populus monilifera*), grown in Minnesota and the Dakotas.

'The fumigating houses were kept open with a superintendent constantly in attendance through the seasons of spring and autumn shipments of stock. As all vege-

tation is much earlier in Oregon and Washington States, from which most shipments are made into British Columbia, it has been arranged that for that province the fumigating house shall be kept open for the winter months from October 15 till March 15. For Manitoba and the eastern provinces the spring season is from March 15 till May 15, and the autumn season from October 7 till December 7.'

The provisions of the federal San José Scale Act have been rigidly enforced and with excellent results, for there has not been a single well-founded complaint of injury to stock, of undue delay chargeable to the fumigation or of living scales having been found on any trees in the large number of consignments of nursery stock which have been imported into Canada through the fumigation stations. The superintendents of the various stations are as follows :—At St. John, N. B., Mr. Herbert E. Goold ; at St. John's, Que., Mr. P. H. Dupuis ; at Windsor, Ont., Mr. Colborne Wright ; at Niagara Falls, Ont., Mr. O. N. Garner ; at Winnipeg, Man., Mr. A. K. Leith ; and at Vancouver, B.C., Mr. Tom Wilson. Every one of these officials has shown the greatest interest in the work and, recognizing the responsibility imposed in him, has made every effort to do the work thoroughly and well.

There has been some misapprehension in the province of British Columbia as to the exact object the Honourable Minister of Agriculture had in view when establishing the fumigating house, and it is well to state plainly that this work is being done simply and solely against the San José Scale. The length of the exposure to which the trees are subjected to the poisonous gas is calculated for the destruction of that insect alone. Incidentally, many other insects on the bark of the trees are destroyed ; but there are several, such as borers inside the wood, or insects in the egg condition, which would be little affected by the short exposure of 45 minutes, and there never was the slightest idea when the work was instituted, that these would be reached by this fumigation. From the publication in a British Columbian newspaper of a letter containing an unjust and unfair criticism of the fumigation work being done at Vancouver, it became necessary to publish an explanation of this fact in the same newspaper, the Vancouver *News Advertiser* (December 3, 1901).

In this connection it is but just to draw attention to the excellent work which has been done in Canada by the provincial Government of Ontario, through Mr. George E. Fisher, the Inspector of San José Scale, who, since his appointment, has worked most assiduously under instructions from the Honourable John Dryden, Minister of Agriculture for Ontario, in tracing up nursery stock imported before the enactment of the San José Scale Act, in inspecting nurseries and orchards, and in trying careful experiments with spraying pumps and nozzles, several important modifications and improvements of which are due to his ingenuity. Mr. Fisher has also tried every remedy which has been advised from time to time. I have had the privilege on many occasions of examining this work and can testify to the zeal and care which have been shown at all times by Mr. Fisher and his assistants. The most useful report of the Inspector of San José Scale for 1900, published by the Ontario Government last spring in time for use in 1901, ought to be read carefully by every one interested in fruit-growing in Ontario.

There is at the present time a much more decided and intelligent interest in this subject than has been the case since the first appearance of the San José Scale in Canada. Fruit-growers have learnt by bitter experience in some cases, or they have seen in the orchards of others evidence of the capabilities of the San José Scale for destroying fruit trees and the rapidity with which this work is accomplished. As a result many are now trying remedies, who a short time ago refused to believe that there was any use in them, or that any remedy was necessary.

Remedies.—The great outcry to-day is for a definite remedy. After examining the results of the Ontario experiments, and those of Prof. Webster, in Ohio, which, on account of the very similar conditions prevailing in the two areas infested, are complementary to each other, it is evident that there are three remedies, which may be called practical remedies, by which the San José Scale may be controlled to such an

extent that the owner of an infested orchard may hold the scale measurably within control and that at the same time the trees can by thorough treatment every year be kept in a condition to bear paying crops of fruit.

Whale-oil soap and crude petroleum, applied carefully as recommended below, will kill 90 per cent of the scales, and fumigation with hydrocyanic acid gas will, at a moderate expense, kill every scale on trees small enough to be covered by tents, barrels, boxes, or other tightly closing structures, of which the cost of manufacture and handling is not so great as to make the operation impracticable. What is possible on a few trees, will in time be done on many if it can only be shown that it is a paying operation. Since experiment has shown that with the below described remedies a larger proportion of the insects can be destroyed than are produced naturally every year, it is only a logical conclusion that the trees will year by year become freer and freer from this most pernicious enemy. I feel sanguine that with constant treatment, such as is year after year practised for some other crop pests, even orchards infested by the San José Scale may before long be rendered free of that pest. But regular annual treatment is absolutely necessary while there are any living scales on a tree. Where infested trees have been neglected for only a single summer, they have quickly become coated over again with the scales so as to be almost, or quite as bad, as they were before they were treated.

The three remedies which have been proved to be the best in Ontario and northern Ohio are the same which were mentioned in my last report, but further experiments during the past summer have added to our knowledge, as to the best way to apply them :—

1. Whale-oil soap.—This is a trade name for a potash fish oil soap which can either be made at home or purchased from firms in Canada, who have made a specialty of manufacturing it, with only the required amount of moisture and with the proper amount of potash. Two of the brands made in the United States, which have given good satisfaction to those who have used them in Canada, are those of W. H. Owen, of Catawba Island, Ohio, and Good & Co., of Philadelphia, Pa. To be efficient, these soap washes must be made of the strength of 2½ pounds of the soap to the imperial gallon of water, and to dissolve the soap thoroughly it is necessary to use hot water ; the mixture to be applied in the form of a spray before it cools if possible. This, however, is not necessary, because owing to the soap being made with an excess of potash, 10 or 12 per cent, the mixture will remain liquid when it cools, even at the above strength. The best time to spray the trees is just before the buds burst in spring. Although, as a general statement, orchards treated with this soap wash in Ohio were not so free of the scale as those which had been sprayed with a crude petroleum mixture, still it is a significant fact, that the two cleanest orchards of all those examined in an area of 35 miles across, which had been at one time infested and had been subsequently in a certain measure cleaned up, had been brought to their present good condition by the use of whale-oil soap. No very bad trees could be found in those orchards, and it was only with difficulty that any scales could be seen. For peach trees this remedy is decidedly the safest to use. Its only drawback is the cost of the material. In large quantities it can be purchased or made for about 3½ cents a pound, and, of the strength above advised, it would require one and a half gallons of mixture containing 3¾ pounds of soap to an average-sized full grown peach tree, making about 12 cents for material for each tree. The great advantage is that there is no danger of injuring the trees, and, further than this, the amount of potash in the soap makes it a decidedly beneficial application for the trees. There is good evidence that whale-oil soap is an excellent remedy for the fungous disease known as the Peach Curl (*Exoascus deformans,* Tul.) which for many years has caused much loss in Ontario peach orchards. It is also useful against many other insects than the San José Scale, particularly several kinds of scale insects, the Pear Psylla and others, which pass the winter hidden beneath scales of the bark of fruit trees.

2. Crude petroleum, where it has been thoroughly applied, has had a decidedly quicker and more fatal effect upon the scale insects than the whale-oil soap, but it is

also very much more liable to injure the trees treated. Crude petroleum may with care be applied to healthy peach trees in a mechanical mixture with water containing 20 to 25 per cent of the oil ; but, when using this mixture, it is rather difficult even with the best pumps made for the purpose to keep the percentage of oil constant, and, if applied carelessly by reckless, inexperienced or inattentive men, there is great risk of the trees being killed. When recently examining the results of the experiments made with crude oil on Catawba Island, Ohio, and also in Ontario, the benefit of special training of operators in this kind of work was very apparent. Where orchards had been carefully and skilfully sprayed, excellent results had followed. This was particularly the case where the work had been done by the trained Government officials, but, besides this, where good practical fruit-growers had carried out instructions carefully, the trees had been protected and paying crops had been gathered. The advantage of experience was also conspicuous in some of these orchards, the owners acknowledging that, although they thought they had done good work the first year, they could easily see that the second year's work was far better, and they believed that they would be able to do more thorough work next year and secure better results. Where trees, as was the case in some places, had been treated in an indifferent or perfunctory manner, very little good had been done, even although considerable expense had been incurred. Spraying for the San José Scale, to be effective, must be done with the greatest care as to every detail, and with great thoroughness, so that every part of the tree is reached with the material sprayed. I found that one of the most fertile causes of imperfect work was the difficulty of reaching the whole of a tree with the mist-like spray in which it is necessary to distribute the liquids. This work is facilitated very much by a wind which will help to carry the spray through the branches. Unfortunately, a change of the wind favourable for spraying both sides of the trees seldom occurs in the same day, or within a short space of time. Several fruit-growers had sprayed one side of their trees, but as there had been no favourable wind for the other side, only half of each tree had been treated. The good effect of the crude oil was remarkably apparent on some of these trees which had been only lightly infested in the spring. The side which showed on the bark the residue of vaseline left after the volatile parts had evaporated, was free of living scales, while on the other side of the same branch there was a thick coating of healthy scales reaching right up to the oily surface. Crude petroleum is a very effective and cheap remedy, but great care must be exercised in using it.

During the summer of 1901 the experiments with this substance have been earnestly watched by fruit-growers, and several have themselves experimented with it. Much good work has been done on peach trees with a 15 per cent mixture, and no cases of injury are recorded. As an outcome of this work, there will doubtless be a much more extensive use of crude petroleum oil next year. It is to be feared that the good results obtained in destroying a large proportion of the scales without injury to the trees with 15 per cent and 20 per cent mixtures may, next season, possibly give rise to a reckless or careless spirit when spraying orchards so as to get quicker and more decided results. This is a real danger and it seems most desirable to advise caution, or there may be considerable loss from trees being sprayed with too much oil. Fruit-growers must bear in mind that the application of remedies for such a persistent enemy as the San José Scale is no easy matter which can be attended to by an untrained man, unless the greatest care is exercised. From what I have seen of the work, I judge that the heavy oils are the safest and the most effective. Prof. J. B. Smith, of New Jersey, says :—'It is a fair requirement that a straight crude petroleum should have a specific gravity of 43° or over by the Beaumé oil test, at a temperature of 60° Fahr. ; anything less might be harmful ; anything more than 45° is unnecessary.' When the heavy oils have been used, the deposit of vaseline on the bark remains for a long time and without injuring the trees renders the bark unsuitable for the scales to fix themselves. The oils which have been used for the most part in Ontario are Canadian oils which Mr. Fisher tells me test 39·10° to 39°, Beaumé. Upon peach trees

crude oil should not be used in a higher percentage than 20 per cent. The safe limit for plums and pears seems to be 25 per cent, and for apples 30 per cent may be used. For peach trees, Mr. Fisher believes that not more than one quart of crude oil, costing two or three cents, should be applied to each average-sized peach tree, whether this be applied undiluted by means of a very fine specially prepared nozzle or in a mechanical mixture. The only purpose of the water in such a mixture is to act as a vehicle for the oil by which it may be distributed over a wider area as a very thin film. The water evaporates almost immediately and leaves the oil on the trees. For this reason it is important not to go over the same part of the tree twice as has sometimes been done with ill effects by thoughtless operators.

'Freeman, Ont.—The specific gravity of the Canada crude oil used against the scale was 39½° to 39°, and that of the Pennsylvania crude oil was 44½°. The Canada oil killed the scale and protected the trees from re-infestation better than the American oil, but was also slightly more trying to the peach trees. Japan plums were not injured by 25 per cent Canada oil with water, and in one instance two applications were made, the second two days after the first. The only case of injury that has come to my notice from the use of crude oil on plum trees was when it was used undiluted, and in this case Japans and the Egg varieties alone suffered.'—George E. Fisher.

3. Fumigation.—Undoubtedly the most effective remedy for small trees or bushes is fumigation with hydrocyanic acid gas which will destroy every living scale without injury to the plant. For small trees this has proved most useful, but for large trees the necessary tents and apparatus are expensive, easily injured, and handled with difficulty, particularly when there is a wind blowing. There are also difficulties which are yet to be overcome in the way of getting the gas equally diffused beneath large tents. Mr. George E. Fisher has done good work by using inverted tight barrels as gas chambers for fumigating bushes and small trees. These were ordinary tight apple barrels each of which contained 4¼ cubic feet of space and for which 1¼ grammes of cyanide of potassium, 2 grammes of sulphuric acid, and 3 grammes of water were used to generate the necessary gas. In a few instances double quantities were used without any injury to the trees. Larger trees were covered with tents. Mr. Fisher says :—'We used cyanide 20-100 and 25-100 of a gramme to the cubic foot of space inclosed, mostly 25-100, though I think that 20-100 did just as effective work in September as did 25-100. The 20-100 was exposed 35 minutes and apparently killed all of the scale. Most of the trees treated with 25-100 were exposed 45 minutes without injury and 20-100 killed the scale at 35 minutes in September. I still think there is a lot in the time of year this work is done. Prof. Lowe, of Geneva, New York, says he used cyanide in various strengths from last December to June, 18-100, 25-100 and 30-100. The 25-100 had no effect in killing the scale during low temperatures, and 30-100 used at the same time killed it all—exposure in both cases 45 minutes. In June 18-100, exposure 30 minutes, killed all of the scale. This bears out my contention that the scale is much more susceptible to the gas treatment when it is active than when dormant. It also goes to show that a stronger gas will kill it in very cold weather, which I have doubted, but which I shall take some pains to prove this winter.'

In practice it may be found convenient not to trust solely to any one of the above remedies, but to use a combination of two or more, in accordance with the difficulties which in treating any orchard may arise from many causes, dependent upon the locality, the size of the trees, or the facilities for obtaining materials. For small trees fumigation will probably be found most convenient and for large ones spraying with Whale-oil Soap or Crude Petroleum after the trees have been pruned of all unnecessary wood.

When judging the conditions of trees which have been infested by scale, or which have been treated for its eradication, it is necessary to consider, first, what the condition of the trees is at the time, and also what state, judging from surrounding trees, they would have been in if nothing had been done to relieve them. It is not always

easy to detect at first sight when a tree is in a reduced state of vigour, and hidden injury may sometimes be going on in an apparently healthy tree. In estimating the effects of a remedial measure upon a tree which fails suddenly, a close examination should always be made to see if this may not have been due to some other cause. There are many insidious insect and fungous enemies of fruit trees, such as the various wood and bark borers and root-attacking enemies. As is well known, the brush pile, containing much more than the annual prunings, is a conspicuous object on all fruit farms. Dead trees—dead from various causes—are often found in all orchards, necessitating frequent renewals. Moreover, there is always a tendency to try experiments which are considered dangerous, upon trees which are injured or thought to be of little use. If these die while under treatment, care must be taken to attribute the loss to the right cause, and not unjustly to charge all losses to the remedy. There are certain indications of impaired vigour which may be recognized at sight by an observant investigator, while others, again, are more obscure. In Ohio orchards, Prof. Webster pointed out to me—and Prof. Forbes tells me that he has noticed the same thing in Illinois—that, when a tree is from any cause in an enfeebled condition, this may be frequently detected by the well-known evidence of the presence of the Fruit Bark-beetle (*Scolytus rugulosus*, Ratz.), which burrows into the bark and causes gum to exude at the openings of the galleries. This beetle, it is thought, does not attack perfectly healthy trees, but, nevertheless, its work is frequently conspicuous on trees which as yet have not shown any evidence, by the foliage and general appearance, that they are sickly. While discussing this matter recently in an Ohio orchard with the two gentlemen above named, we found an apparently healthy peach tree, which had green leaves and was bearing fruit, but the trunk and limbs were dotted with the gummy exudations which mark the work of the Fruit Bark-beetle. Upon digging around the roots of this tree, it was found that the greater portion of the root growth was dead. This accounted for the presence of the Fruit Bark-beetle on this apparently healthy tree.

Both the Peach Bark-beetle (*Phlœotribus liminaris*, Harr.) and the Shot-hole Borer (*Xyleborus dispar*, Fab.) have likewise been wrongly charged with being the cause of fungous diseases, because they have been found abundantly upon trees only showing slight traces, or as yet none at all, of the diseases. The former of these has been thought to be the cause of the 'yellows' in the peach, and the latter has similarly been written about under the title of the Pear-blight Beetle.

Mr. G. E. Fisher drew my attention to a characteristic growth easily recognized on peach and other trees badly affected with the San José Scale, in which the tree, as an effort to save itself, throws out strong water-shoots at the base of the larger branches. This is so frequent that he has styled it the 'trade mark of the scale.' It was very apparent in one orchard of seriously injured apple trees which we visited together, near Blenheim.

THE GRAPE-VINE COLASPIS
(*Colaspis brunnea*, Fab.).

Attack.—Small pale yellowish beetles about one-fifth of an inch long, with elevated lines on the wing covers, swarming on grape vines in July, August, and September, feeding on the foliage, riddling it with small round holes, sometimes leaving little more than the veins of the leaves.

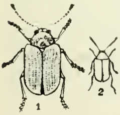


Fig. 18.—The Grape-vine Colaspis—enlarged and natural size.

During the past summer the first recorded occurrence in Canada of this insect doing damage was reported as follows :—'Queenston, Ont., July 15.—I send you three small enemies and a grape leaf. For three years I have been troubled with them. They appear in July and are on the increase until early September, when they suddenly disappear. In 1899 I had three acres of young grapes badly eaten before I noticed them. Spraying with Bordeaux mixture checks them, though does not entirely rid the vines. As no one here knows the insect nor has had trouble with

it, I take it to be an unusual visitor. Kindly tell me what it is and the best way to eradicate it.'—W. O. BURGESS.

Mr. Burgess was written to that his enemy was the Grape-vine Colaspis, and informed that the remedy usually recommended was to jar the beetles from the vines early in the morning onto sheets spread beneath, when they could be collected and destroyed. He answered as follows :—

'Queenston, July 18.—Even in the early morning the beetles fly so quickly that it would not be feasible to shake them from the vines, as you suggest. I have 2,500 vines, more or less damaged at the tips, and, from the experience of the past two years, I expect next month to be the worst.'

'Toronto, November 27.—In reply to your inquiry, I tried about July 18 (when the beetles first made their appearance in any numbers), first, 4 oz. Paris green in 40 gallons Bordeaux mixture, then 5 oz., and then 6 oz., without doing any real damage to the foliage ; yet it was hardly a success. It was then that I wrote you in reference to whale-oil soap. After receiving yours in reply, as I had no soap handy, I decided to go a little stronger and used 7 and 8 oz. of Paris green and lime and water, but no bluestone. This spray mixture cleaned out all the beetles (practically) and did some considerable damage to the tips. Take it all in all, the 7 oz. should be sufficient to destroy the Colaspis, and the vines soon get over the effects of the burning. They were set back very little with me. One block of 1,188 vines of the spring planting were badly "hit"; yet, a vineyard of the same size at the other end of the farm, which as a "spring planting," was badly eaten, as a yearling block, was left alone. With me the Colaspis only attacks the spring planting and leaves the sturdier vines alone. I believe 4 oz. of Paris green is not sufficient, and another year I will use 7 oz. and try and get them early. If I remember correctly, the beetles appeared the same time each year, about the 15th July.'—W. O. BURGESS.

The life history of the Grape-vine Colaspis has been studied by many investigators. Dr. C. V. Riley published an article on the subject in his *Third Missouri Report,* and Prof. Forbes has also treated of it at length in his *Thirteenth Report,* p. 156.

The injury by this beetle is, as was noticed by Mr. Burgess, largely confined to the tender foliage of young grape vines. There are many plants, however, which are occasionally attacked by it in either the larval or perfect form. Among other plants, injuries have been reported upon strawberries and beans, upon which the attack is frequently of a serious nature, the roots of strawberries being injured by the larvæ, and the leaves of strawberries and beans being destroyed by the beetles. Other plants attacked are the potato, clover and the dock. The beetle has also been noticed devouring the silk of corn before the kernels had been fertilized.

Dr. Riley was of the opinion that this insect should have been considered primarily a strawberry pest. He says, *Missouri Rep. 3,* p. 83 : 'We are now treating of this insect as a grape-vine pest ; but it is difficult to say whether the Crown-borer (*Tyloderma fragariæ,* Riley) or this root eater is the most injurious to the strawberry. The work of the two is esentially different, the white Crown-borer confining itself to the crown, and its more dingy ally devouring the fibrous roots and working into the more woody part from the outside. At this work several of them frequently may be seen with their heads stuck into different parts of one root. They may be found upon the roots all through the fall, winter and spring months, and do not begin to change to pupæ in this latitude till the month of June. The beetles appear during that month and continue to issue till towards fall.' After leaving the ground the Grape-vine Colaspis beetles feed for a short period on the young leaves of the strawberry and do some injury. After feeding for a time, they deposit their eggs and fly to the vineyards, where they are found, as was the case in Mr. Burgess's vineyards, about the middle of July.

The remedies which have been recommended are the application of poisonous mixtures to the foliage and the shaking of the beetles from the vines very early in the morning before they become active. Whale-oil soap has been found very effective

against some beetles which are little affected by poisonous mixtures, such as the Rose Chafer (*Macrodactylus subspinosus*, Fab.) and the Striped Blister-beetle (*Epicauta vittata*, Fab.), and it is probable that it might also be useful against this chrysomelid. It would be well worthy of a trial, should the beetles be found again next year either upon strawberries or afterwards when they have flown to the vineyards. The whale-oil soap now largely used by fruit growers in western Ontario is a fish oil soap containing a large percentage of potash.

FOREST TREES.

The only insect enemy of forest trees which has been the subject of considerable correspondence and which has attracted public attention, is the Birch Skeletonizer (*Bucculatrix canadensisella*, Cham.). It seriously disfigured birch trees in all parts of Ontario and in some parts of the province of Quebec in late summer. The insect was treated of fully in my report for 1892, when a similar abundance of the insect occurred. In the following year very few birch trees were injured and since 1893 nothing has been seen of it until this year. It is to be hoped that we may experience next year a similar disappearance of this enemy to the birch.

A NEW ENEMY OF CONIFERS
(*Semiophora youngii*, n. sp., J. B. Smith, ms.).

A very interesting new species of noctuid moth belonging to the genus Semiophora was discovered during the past summer to be a pest of some importance to tamarack or American Larch (*Larix Americana*, Mx.) and the Black Spruce (*Picea nigra*, Poir.). The moth, which is a very beautiful species, was reared from the larva, and the first specimens were discovered by Mr. C. H. Young, of Hurdman's Bridge, near Ottawa, a most enthusiastic and painstaking entomologist, as well as a successful breeder of insects. The species has been named in honour of the discoverer, by Prof. John B. Smith, the leading specialist in this group. The first moths were taken by Mr. Young in August, 1899. On May 30 last I visited the Mer Bleue, an extensive peat bog near Ottawa, in company with Mr. Young and Mr. Arthur Gibson. On entering the swamp it was at once apparent that some insect was stripping the young tamaracks and spruces, and after a short search we discovered that this had been done by a strikingly handsome noctuid caterpillar about an inch and a half in length when full grown, of a rich velvety brown, with a ruddy or greenish tinge in different specimens, the dorsal area showing the richest colours and bounded on each side by the white clear and threadlike lateral stripes. The dorsal stripe of the same intensity as the lateral stripes. The spiracles black and lying on the upper edge of a broad white substigmatal band, the lower surface much paler than the dorsal, the whole body finely mottled with small purplish brown spots. The centre of each segment on the dorsum is darker and more velvety than the intersegmental fold. The head is reddish brown finely mottled with lighter spots.

A large number of these larvæ were collected and a fine series of the moths was reared. The moth, as stated above, is a very beautiful species and varies so much that, had not the specimens all been reared from larvæ which showed little variation, it might have been supposed that at least two species were represented. The moth measures about an inch and a quarter across the wings and varies in the ground colour of the wings from a warm gray almost to a velvety black, the usual lines and marks of the noctuidæ are distinct in most specimens and, as a rule, heavily shadowed inside with a darker shade of the ground colour. The area beyond the subterminal line is strikingly paler than the rest of the wing, except the reniform mark, which is almost

white and conspicuous. The hind wings are fuscous. A detailed scientific description of this moth will be published by Prof. Smith.*

The moths appear at the end of August, and in the early part of September. Specimens reared in confinement and those taken under natural conditions appeared about the same time. Up to the present this species has not been taken in any other locality than in the peat bog above mentioned, but, judging from the devastation and the large number of larvæ which were collected by three of us in about an hour, this species might at any time develop into an injurious forest tree pest. The caterpillars, although well protected by their mottled appearance when on the trees, have the interesting habit of leaving the branches during the day time and hiding deep down in the sphagnum moss at the base, where they in some instances penetrate to the depth of 6 or 8 inches. The moths in nature were found by Mr. Young to rest beneath the branches and were strikingly protected by the resemblance of their mottled closed wings to protuberances on the bark of the branches.

THE APIARY.

The Apiary, under the management of Mr. John Fixter, has been tolerably successful during the past season, both as to yield and as to the interest evinced by visitors. The season has been a fair one for honey, and prices have been good. An evidence of the value of bees in orchards was provided by the poor crop of apples in western Ontario. It was noted by many fruit-growers that during the time that apple trees were in blossom there were no bees flying, and, as a consequence, little fruit was fertilized.

The colonies at the Central Experimental Farm Apiary were housed for the winter in good condition and, as far as can be judged at this date, are wintering well. Several meetings of bee-keepers were attended by Mr. Fixter, where he delivered addresses on practical apiculture and took an active part in the discussions. I myself was honoured by being invited to be one of the three speakers to represent the National Bee-keepers' Association of America at the first joint meeting of the bee-keepers and the American Pomological Society. This important meeting was held at Buffalo on September 13 and 14, during the Pan-American Exposition. The title of my address on this occasion, by request of the association, was 'How flowers are fertilized, with special reference to the Honey Bee.' This was in connection with the subject which had recently been so keenly discussed, whether bees could injure ripe fruit, when the skin of this was unbroken. During the past season, Mr. Fixter, at my request, has carried out a few experiments to test this question. These, as far as they go, are of considerable interest and tend to exonerate bees from all blame in this matter.

REPORT OF MR. JOHN FIXTER.

The season of 1901 has been a pretty good one for bee-keepers. Ontario reports show little or no disease among bees. There has been plenty of swarming, and stocks have been strong and active. But for the hot weather of July an immense yield would doubtless have been recorded. The average yield, however, will not exceed 50 pounds per colony. Some excellent basswood honey is reported and a fair share of clover honey. Quebec reports mention some excellent returns, some as high as 100 pounds per colony ; the average will probably be 75 pounds. The colonies are in splendid condition for wintering.

Returns from the Central Experimental Farm Apiary average 68 sections or 79½ pounds of extracted honey per colony.

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* Since the above was written this description has appeared. See *Can. Ent.*, XXXIV., p. 29.

Meetings at the following places were attended and addresses delivered :—Cumberland, Chard, Rockland, Dunraven, Ont. ; Calumet Island, Que. ; Gananoque and Woodstock, Ont.; and at the American National Bee-keepers' Association at Buffalo, N.Y. Many apiaries were visited near Ottawa during the past summer, and it was noted that all bee-keepers are increasing the number of their colonies very fast and greater interest is being taken in bee culture.

Experiments with different kinds of Hives for comb and extracted honey.

Two hives of each of the following sorts were used :—the Langstroth, the Hedden and two other kinds more or less used in Canada, one measuring 15 x 15 x 12 inches, the other 15 x 20 x 15 inches. Eight colonies of bees were selected all of about the same strength and having good laying queens. The results from the four kinds of hives are shown in the following table, one hive of each kind being arranged for section honey, the other for extracting honey. The hives are tabulated in the order of the returns they gave.

Hive.	Swarms.	Sections produced.	Extracted honey.
			Lbs.
1. Langstroth	1	67	79
2. 15 x 15 x 12 inches	1	56	63
3. Hedden	0	54	62
4. 15 x 20 x 15 inches	0	0	23

The large hive 15 x 20 x 15 inches appears to be too large ; the bees building up well in the brood chamber but not going up into the surplus boxes, either in sections or extracting frames.

Further Experiments in feeding Sugar Syrup for Winter Stores.

During the autumn of 1900, an experiment was started with four colonies. All the natural stores were removed on September 17, 1900. A Miller feeder was placed in an empty section super, close to the top of the brood frames, any part of the brood frames not covered by the feeder being covered with a propolis quilt cut so as to allow the bees a passage through it. By keeping the feeder well packed around, except where the bees enter, the heat is kept in and at the same time the bees cannot daub themselves with the liquid. In this experiment the bees had a constant surplus of syrup. This syrup was made of the best granulated sugar, two parts to one of water by weight. The water was first brought to a boil, then the boiler was set back on the stove and the sugar having been poured in the mixture was stirred until the sugar was all dissolved. This syrup was supplied to the bees at about blood heat. When put into winter quarters the wooden covers were removed and replaced with a chaff cushion ; the hives were also given extra ventilation at the bottom by placing at the entrance a wooden block between the brood chamber and the bottom board, raising the front of the brood chamber about 2 inches extra. During December and January considerable, though not excessive, humming could be heard. During February and March and until they were set out, there was but very slight humming. There was no sign of uneasiness nor any dysentery during the whole winter. Each colony when put into winter quarters weighed on an average 52½ lbs. ; when taken out in the spring, 40 lbs. 10½ oz. The hives were set on their summer stands April 1, 1901. The bees then began to work at once and built up rapidly and were in excellent condition when the honey flow came on. During the summer each hive gave one swarm and made on an average 78 sections of honey. This experiment will be continued with the same colonies and their progeny for several seasons.

Experiments with Foundations of different sizes in Sections.

Experiments have been continued with comb foundations of different sizes in sections. There were in each hive four sections for each size of foundation.

(1.) Full sheets fastened at the top and fitting closely to the sides and down close to the bottom.

(2.) Half sheets fastened at the top of the section.

(3.) Quarter sheets.

(4.) Two inches square, fastened in top centre of section.

(5.) One inch square, fastened in top centre of section.

(6.) No foundation at all.

No. 1.—Full sheets of foundation gave the best results ; the bees began to work on them first and filled them out better. When the sections were shipped, they did not break so easily, and consequently they brought the highest prices.

Nos. 2 and 3.—Very few of the sections which had only one-half or one-quarter sheets of foundation were well filled ; in no instance were they filled as well as those with full sheets.

Nos. 4 and 5.—The bees did not begin to work in these sections until they had the full sheets nearly all drawn and filled. Several sections were only half finished.

No. 6.—The bees did not start to work in any section where there was no starter. From this and many other experiments the advisability of always using full sheets of foundation is apparent. This should be of soft thin wax so that it will not be noticeable when the comb-honey is eaten.

Experiments with Brood Foundations of Different Sizes.

(1.) Full sheets. (2.) Half sheets. (3.) Two-inch strips of foundation across the tops of the frames.

(1.) Full sheets in every instance appear to be the best ; the bees go to work on them at once and they build all worker comb on the foundation ; a few drone cells are sometimes built where the comb does not touch the bottom or sides of the frame ; this alone is quite an advantage. Moreover, the sheets are securely wired, making them fit for either brood or extracting frames ; they will also stand a heavy swarm, or shipping without breaking down. (2.) Half sheets.—The bees built worker comb as far as the foundation went, then the balance drone comb. (3.) Strips of Foundation.—In this instance the bees started to work, not in the frames, but in the sections in the super, which had full sheets of foundation, sooner than in No. 1 and 2. Queen excluders had to be put on to prevent the queen going up into the super. The combs in the brood chamber were very unevenly built so that the frames could not be lifted out without the combs being broken, and some of these combs were more than half drone cells. They could not be used for extracting frames, as, not being wired, they were too weak. From the results of this experiment and the previous one, it is therefore plainly better in all cases to use full sheets of foundation both in the sections of the supers and in the frames of the brood chambers.

Experiments to test whether Bees injure Sound Fruit.

For many years the question as to whether sound fruit was injured by honey bees has been under discussion, but last year special attention was drawn to this question by a law-suit between a fruit-grower and a bee-keeper, the former claiming that his fruit had been seriously injured by the bees of his neighbour, while the bee-keeper brought evidence to show that not only was this not the case, but that it was impossible. This question was of so much interest to bee-keepers that the following experiments were undertaken to determine whether bees, even when deprived of food, would attack fruit placed within their reach. The results here given indicate that such is not the case, which merely confirms the conclusions arrived at many years ago.

Prof. Slingerland, of Cornell University, in an article in the Rural New Yorker of November 10, 1900, cites the experiments which were carried out in 1885, by Mr. N. W. McLain, of Aurora, Ill., by instruction of Prof. Riley, United States Entomologist, from which these conclusions were drawn. (See U.S. Ent. Rep. 1885.)

On September 7, 1901, when there was no surplus honey to be gathered on plants outside, ripe fruit of four different kinds, viz., peaches, pears, plums and grapes, was exposed in different places near the Experimental Farm Apiary where it was easily accessible to the bees—

(*a*.) Inside bee hives ;

(*b*.) On branches of trees in the apiary inclosure ;

(*c*.) On shelves in a work-shop to which bees had access through an open window.

Every care was taken that all the fruit used in this experiment should be perfectly sound.

A.—Fruit exposed inside bee hives.

The fruit was exposed in three different conditions : (1.) Whole fruit without any treatment ; (2.) Whole fruit which had been dipped in honey ; (3.) Fruit which had been punctured in several places with the blade of a penknife.

Four colonies were selected for this experiment, all of about equal strength. Each of these colonies was in a hive upon which was placed a super divided in the middle by a partition. From two of the hives the honey had all been removed, in the two remaining hives five frames were left, each having considerable brood, with honey around it. The former two at the beginning weighed on an average 27 pounds, the latter two 34½ pounds. In each one of the four hives, the whole specimens of fruit not dipped in honey were hung within three empty frames, tied together as a rack ; the whole specimens of fruit dipped in honey were placed in one compartment of the super and the punctured specimens were placed in the other.

The bees began to work at once both upon the dipped and the punctured fruit ; the former was cleaned thoroughly of honey during the first night ; upon the punctured fruit the bees clustered thickly, sucking the juice through the punctures as long as they could obtain any liquid.

At the end of seven days all the fruit was carefully examined. The sound fruit was still uninjured in any way, but had the surface polished and shining as if the bees had been travelling over it trying to find some opening through the skin. The dipped fruit was in a like condition, quite sound, but every vestige of the honey had disappeared. The punctured fruit was badly mutilated and worthless, beneath each puncture was a cavity and in some instances decay had set in.

The experiment was continued the following week, the undipped sound fruit being left in the brood chamber ; the dipped fruit was given a new coating of honey and replaced in the super, and a fresh supply of punctured fruit was substituted for that which had been destroyed.

At the end of the second week, the condition of this fruit was entirely similar to that of the first lot.

For the third week fresh samples of fruit of all the above kinds were used, because some of the sound fruit had begun to decay ; this fruit, however, had the skin unbroken, and in no case had the bees done any damage. The results were the same as before.

After the third week the bees belonging to the two hives which had been deprived of all the honey appeared to be very sluggish, and there were many dead bees about the entrances of the hives. These colonies had lived for the first three weeks on the punctured fruit, and on the honey off the fruit which had been dipped. As there were at that season few plants in flower from which they could gather nectar, these bees had died of starvation notwithstanding the proximity of the ripe, juicy fruit. This supply of food, which they were urgently in need of, was only separated from them by the thin skin of the fruit, which, however, this evidence seems to prove they could not

puncture, as they did not do so, although they kept crawling over it continuously.

The mean weight of each of these two hives on the 7th September, when the experiment was begun, was 27 pounds. At the end of the experiment, four weeks later, each had lost $3\frac{1}{2}$ pounds. The mean weight of the two hives in each of which were left five frames with brood and honey, was at the beginning of the experiment, $34\frac{1}{2}$ pounds. The mean loss for each of these hives was $2\frac{1}{4}$ pounds.

B.—Fruit exposed in the open air, hung from the branches of a tree in the apiary inclosure.

In this experiment two sets of whole fruit were used, one being dipped in honey, the other punctured as before. The bees worked exactly as in the hives and with the same results.

C.—Fruit exposed on shelves in a workshop, adjoining the honey-house.

This, like the preceding experiment, consisted of dipped fruit and punctured fruit. Although the bees did not work so freely inside this building as they did on the fruit hung outside on the trees, and that in the hives, still the results were practically the same in every case.

Answers to Correspondents.

Question 1.—One of my hives is full of webs and grubs. What is the remedy ?

Answer.—The grubs are the caterpillars of the Bee Moth (*Galleria mellonella*, L.), more properly called the Wax Moth, the most troublesome of the enemies of the bee-keeper. Fig. 19 shows it in its different stages. The full grown caterpillars or 'grubs' shown at 19*a*, natural size, are very active, of a dirty white colour, when full grown about an inch in length. They sometimes occur in large numbers in neglected hives, and eat long galleries through the comb, feeding on the wax and the bee bread in the cells, destroying also any young bees that come in their way, and finally driving the colony from the hive. The eggs of the Wax Moth are very small, oval, glistening white at first, but assume a pink colour before hatching. They are inserted by the mother moth into any crack or crevice in or about the hive, by means of a long tube-like ovipositor. As soon as the young caterpillars hatch they begin to spin, as a protection, a silken tube in which they live during their whole larval life. This tube is enlarged and extended as they progress. When full grown they leave these tubes and creep into a crevice or corner, generally near the bottom of the hive, where they spin a tough cocoon (Fig. 19*b*) of white silk mixed with pellets of black excrement. The pupa (Fig. 19*c*) may be found inside the cocoon. The perfect insect is figured of natural size, a female with wings expanded, at *d*, and a male at rest at *e*. There are normally two broods of this moth in the season, the first appearing in May and the second, usually much more numerous, in August. In infested combs brought into a heated office for study, the moths appeared at the end of March and through April well into May. The moths are of various tints of dusky gray and differ a good deal, some being much lighter in colour than others, and some specimens of both sexes being of a more ruddy brown. They are not easily seen when at rest, as in colour they resemble very closely old weathered wood, a resemblance which is heightened by numerous dark spots on the wings. The peculiar shape of the wings, as is shown in the figure above, will easily enable any one to identify this insect. The moths are about three-quarters of an inch long, and when at

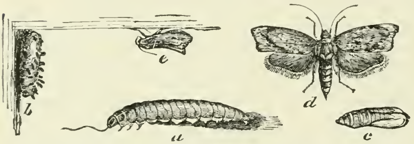


Fig. 19.—The Wax Moth ; *a*, caterpillar ; *b*, cocoon ; *d*, female moth ; *e*, male moth at rest.

rest the wings are folded so as to leave a narrow flat space at the top, and then slope downwards abruptly. When disturbed they run with great rapidity and slip quickly beneath any available shelter. They fly with ease and enter bee hives about dusk for the purpose of laying their eggs.

The indications of the presence of the Wax Moth grubs in a hive are well known to most bee-keepers. If the little black pellets of excrement, like small grains of gun-powder mixed with bee-bread or broken cappings, are at any time noticed on the bottom board around the entrance, the hive should at once be carefully examined, and steps taken to remove any caterpillars that may be found. If attended to promptly while the grubs are few in number, this is an easy matter, but if they are neglected and allowed to increase, as they will very rapidly in the spring, much destruction will be wrought in a surprisingly short time. When a grub is detected, it should be picked out with a knife or other sharp instrument (a pair of fine but stiff tweezers will be very convenient) and crushed. There will, of course, be some injury to the comb, but this the bees will soon repair. When the grubs occur only in small numbers, the bees will, as a rule, if the colony be of proper strength, keep them down themselves. Italian bees are rarely injured by moths. The wide-awake bee-keeper will also provide against weak and queenless colonies, which from their enfeebled condition are the surest victims to moth invasion. No bees either Italian or Black will be troubled so long as the combs are covered with bees. If through carelessness a colony has become thoroughly victimized by these wax devourers, the bees and any combs not attacked should be transferred to another hive, after which the old hive should be fumigated with sulphur, then by giving one or two of each of the remaining combs to strong colonies, after killing any pupæ that may be on them, they will be cleaned and used ; while by giving the weak colony brood and, if necessary, a good queen, it will soon recover.

The following experiment was carried out. Two hives which had been deserted by their swarms in the autumn, were left in the bee yard until the bees were taken into the cellar for the winter; both hives were full of empty combs and had many evidences of the presence of the Wax Moth grubs. One of these hives showed more injury than the other. The one which had the most grubs was closed up tightly and was left in the house apiary for the winter, where it was exposed to the winter frosts to destroy the grubs. It was examined at different times and was kept in the same place until the swarming season the next year, when, as all the grubs of the Wax Moth were killed, it was given to a new swarm, and was as good as if there had never been a grub in it. The other hive, which at first showed the least symptoms of injury by the Wax Moth, was kept in the bee cellar where the temperature would average about 45 degrees during the winter. This hive was also tightly closed at the top and bottom like the former, so that no moth could either get in or out. In the spring, when carried out at the time the bees were set out, it was found to contain hundreds of grubs and winged moths. The comb had been entirely destroyed and was bound together into a solid mass by the webs. From this experiment and others (See Report Entomologist and Botanist, 1895, p. 174-177), it is clear that freezing is a good method to keep down the Wax Moth in all localities where the thermometer drops to zero (Fahr.) during the winter.

All empty combs should during the winter be suspended from strands of wire stretched across a dry shed, so that they will be safe from mice, but at the same time exposed to the full intensity of the winter cold. During the summer while not in use all empty combs should be kept in a dark cellar and examined at short intervals.

Question 2.—How should bees be packed for shipping in hot weather ?

Answer.—During hot weather great care must be exercised that bees are not smothered or their combs melted, by the great heat which is generated inside the hive when insufficient ventilation is provided during transit. To ship long distances it is necessary to remove both the top and bottom boards of hives and cover both the top and bottom with fine wire cloth. The covers must be put back again as a protection,

but over, and raised from, the wire cloth, which must be carefully tacked over the two ends of the brood chamber. The boards are supported at each corner on blocks one inch by one inch, and about two inches long, with a single screw through each to hold it in its place. The wooden covers which are supported by the blocks are also made fast by screws. The entrance must be covered with wire cloth. For short distances the bottom board may be left undisturbed. It is almost absolutely necessary that combs should be wired, or at least that they be old and tough and securely attached to the bottom bar. It is always risky, however, to ship combs when not wired, for it is impossible to tell what sort of rough usage the package may receive at the hands of express agents. The bees buzzing around the wire cloth are usually sufficient to guarantee gentle handling, but, as many people do not know how to handle and take care of bees, plain instructions should be placed on each hive.

Question 3.—Is it safe to move bees from one part of the apiary to another ?

Answer.—A great many mishaps have come about from moving bees unwisely. A little thought in regard to the habits of bees will save this. Bees fly from their hives, when looking for honey, one or two miles, but seldom farther than that, unless at a time of great scarcity of pasturage. After a bee has once learnt the location of its hive, it never stops to take the points when leaving the hive, as it does the first time it sallies out in a new locality. The consequence is, if a hive has been moved either by night or by day, bees will when returning with honey fly straight to the old location, and, if on reaching that they find the hive is gone, they are helplessly lost and, even though the hive may be only a few rods away, they will not find it. Whenever hives are moved even short distances during the working season, there is always, as a consequence, a loss of some of the bees. Italian bees, as a general thing, make themselves at home in a new location more readily than the Black bees, and stick more tenaciously to their home and brood. Sometimes shaking the bees down in front of the hive and letting them run into it again, like a natural swarm, will be sufficient to make them stick to a new locality.

Another plan, which has been tried successfully, is to take the hive away for an hour or two until they get really frightened at the loss of their home. They will then all go in eagerly as soon as the hive is brought back to them again. In this case they seem so glad to get their old home again that they will stay in it wherever it is placed.

Sometimes when it has been necessary to move a colony, we have succeeded by first moving the hive to its new location, then placing an empty hive with a comb in it on the old stand for the returning bees to cluster on, because many of them, after leaving the hive in its new location, will not be able to find their way back to it again and will go back to the old stand. These must be taken back to their new location and shaken out close in front of the hive just before dark.

The best plan to follow, when it is necessary to move colonies, is to place a piece of board, or hang an old sack over the front of the hive, so that the bees, when they come out, will recognize that there is a striking change in their surroundings and will circle round and round the hive to take their bearings. These obstructions may be removed after one day, and no further trouble will be experienced.

Question 4.—I have a great many sections half full ; can I mix honey, sugar and water and let the bees finish them ? If so, what proportion of each would be best ?

Answer.—Do not think for one minute of using even the smallest proportion of sugar to finish sections. If you want to feed to have sections finished, use diluted honey, but very few bee-keepers have been able to make it pay. It is better to sell at a reduced price sections that are not finished and let the bees empty out any that are less than half full. Pile up, out of doors, supers of sections you want bees to empty, and allow entrance for only one or two bees at a time. If you allow a larger entrance, the bees will tear the comb to pieces. Sections partly filled may also be fed to weak colonies or those colonies which have not sufficient stores for winter in the following

manner : First, place a propolis quilt over the brood, turn back one corner for an opening, place a super full of one-half filled sections above, uncap all parts of the sections that are not already uncapped, and the bees will very soon empty them and take the honey into their brood chamber. The emptied sections may then be taken off and put away for future use. A good plan to dispose of partly filled sections is to cut each one into small pieces, say two or three, according to amount in them, and sell them at exhibitions, &c.

JOHN FIXTER.

DIVISION OF BOTANY

MAPLE SEED BLIGHT

(*Fusarium*, sp.).

During the past summer a serious enemy to the Ash-leaved Maple (*Negundo aceroides*, Mœnch) appeared at Indian Head and in the surrounding district. An account of this outbreak was reported to me by Mr. George Batho, of the *Nor'-West Farmer*, and, when Dr. Saunders was making his annual visit of inspection at Indian Head, specimens were collected and sent to Ottawa. Material was, at the same time, sent to Mr. Galloway, of the Department of Agriculture, Washington, who reports upon it as follows : 'The maple seeds are thoroughly infested with a fungus resembling *Fusarium*. This fungus is undoubtedly the cause of the failure of the seeds to fill. It is very difficult to combat diseases of this kind on such large trees as the maple. The spores of the fungus are very abundant at present on the seeds, and undoubtedly much might be done to prevent a recurrence of this trouble by gathering the diseased seeds and burning them. If possible, the trees should be sprayed with some good fungicide like Bordeaux mixture. It would be best to do the spraying next season, beginning early and repeating the applications at intervals of about two weeks until the danger is over. It is possible that it would not be practicable to spray, in which case very little can be done except to gather the diseased seeds and burn them.'

Dr. Saunders found the seeds on maples similarly injured in the vicinity of Regina, and as far as Pense. On reaching Medicine Hat, however, the seed on the trees was found to be perfectly healthy. The importance of the Ash-leaved Maple as a shade tree in the West can hardly be over-estimated, and millions of young trees are every year being grown from the seed. Should this disease which has the effect of destroying the kernel of the seed before it fills out, continue, it will be necessary for those wishing to grow young trees from the seed to obtain the seed from some other locality. The disease is, I believe, a temporary outbreak, and hardly likely to last for any great length of time. There is no record of seeds having been similarly affected in previous years.

When trees are affected with this disease the seeds begin to show the injury by the edges of the wing becoming bleached and spotted, and the seeds fail to fill. There was very little indication of this injury to maple seeds when I was at Indian Head in the beginning of July, but it was very noticeable by the middle of August. Mr. D. G. Mackay, who has charge of the forestry plantations at the Experimental Farm at Indian Head, estimates the loss at 90 per cent of the whole crop of seeds. This is a serious loss, as every year large quantities of this seed are collected for distribution to those who wish to plant them.

THE POPLAR RUST

[*Melampsora populina*, (Jacq.) Lév.].

In travelling through the North-west Territories last summer I found the Aspen Poplar (*Populus tremuloides*, Mx.) very badly affected by the fungous disease, known

as the Poplar Rust [*Melampsora populina,* (Jacq.) Lév.], kindly identified by Prof. L. R. Jones, of Vermont. Many apparently healthy trees were remarked in the month of July to have very small and sparse foliage at the tips of the uppermost branches. Subsequently these dropped their leaves and the foliage of many trees became yellow. Later the rust developed conspicuously on the lower parts of Aspen trees, over a wide area of territory.

Mr. Geo. Batho, of the *Nor'-West Farmer,* who is very observant of everything affecting crops of all kinds, sent me specimens of diseased foliage in August last, stating that the rust had been exceedingly destructive to foliage of both poplars and birches all through northern Alberta, the trees in many places being much disfigured and stripped of their leaves. The fungus on the birch foliage proved to be *Melampsora betulina,* (P.) Tul. Both the Aspen and the Birch referred to (*Betula occidentalis,* Hook.) are indigenous in the North-west and are highly valued for planting as ornamental trees on account of their compact growth and beautiful intense green foliage. In the arid country of the interior of British Columbia the beauty of the Aspen is very striking, and, with the sturdy handsome Bull Pine (*Pinus ponderosa,* Dougl.), forms one of the characteristic features of this part of the Dominion. The disease was not observed west of the main chain of the Rockies, but was very apparent in northern Alberta, and was exceedingly destructive to the foliage of the Cottonwood (*Populus monilifera,* Ait.) at Brandon, Man. One row of young trees of this poplar had been so severely attacked for two years running that most of the trees were dead or in a moribund condition when Dr. Saunders visited the Experimental Farm at Brandon in August. Specimens were sent off by him to my address in Ottawa, but knowing that I was then absent in British Columbia, he sent specimens also to Mr. Galloway, the Chief of the Bureau of Plant Industry at Washington, which were reported upon by Mr. A. F. Woods, the Pathologist and Physiologist :—

'I have borne in mind your request for information relative to rust of *Populus monilifera,* and take pleasure in supplying the following data, furnished by our Mycologist, Mrs. F. W. Patterson :

'The disease is caused by the fungus *Melampsora populina* (Jacq.) Lév., and occurs on various species of Populus in this country and in Europe. The uredospores and teleutospores are found on the same leaves, the former causing the yellowing and early fall of the leaves and the latter hibernating on the fallen leaves. The æcidial stage has not been determined with absolute certainty, but Rostrup demonstrated by experiments that the teleutospores of *Melampsora tremulæ,* Tul., which is now thought to be synonymous with *M. populina* on *Populus tremula,* germinate on the leaves and shoots of young pines, giving origin to *Cæoma pinitorquum.* The æcidiospores from the pine in turn produce the uredosporic and teleutosporic stages on the poplar leaves. Hartig also proved that the same Melampsora causes *Cæoma laricis* on the needles of the larch. These experiments, however, were made entirely upon foreign trees, and, so far as our knowledge goes, cultures of spores of *M. populina* and infection experiments with them in this country have been entire failures.

'The Hatch Agricultural Experiment Station, Amherst, Massachusetts, has been conducting experiments with fungicides on *Populus nigra* for several years, with a view of preventing or controlling the disease. In the section in which the Hatch Station is located, the fungus appears during the hot, moist weather of July and August, and, when abundant and appearing at the earlier date mentioned, it kills many of the branches, and the leaves become yellow and fall to the ground.

'The uredo, or summer spores, are formed while the leaves are still on the tree, and are soon scattered by the wind, causing the infection to spread with great rapidity. Spores develop on the fallen leaves, and these spores, which are capable of living over winter, upon coming into contact with new leaves in the spring or summer set up new infection.

'It is said that by the use of Bordeaux mixture the trees have been kept in a perfectly healthy condition. In the experiment four applications of the fungicide were made, two in July and two in August. You could doubtless secure copies of the several bulletins relating to the disease by applying to the Director of the Hatch Station. Account of the poplar rust as it occurs in Europe, is given in Hartig's Diseases of Trees, Tubeuf and Smith's Diseases of Plants, and Geo. Massee's Text Book of Plant Diseases.

'We have in our herbarium specimens of affected *Populus monilifera* collected in Dakota, Illinois, Indiana, Iowa, Kansas, Massachusetts, Montana and Nebraska.'

In view of the large number of cottonwoods which have been imported into Manitoba and the North-west Territories for planting groves, it is important that all information possible should be given concerning this disease, which may at any time develop under favourable climatic conditions and do much harm. Most of the young trees used by planters in the West are imported from Minnesota and Dakota as seedlings, which are collected in large numbers from river banks when one year old. Dr. Saunders noticed particularly that none of the varieties of poplars which had been imported from Russia had so far developed the Poplar Rust. If they should continue to show this immunity, their importance will be very much increased for the West, where already they are highly valued for their rapid and luxuriant growth.

Mr. S. A. Bedford, reporting at the end of the season on this matter, says :—'The rust was very bad indeed on our cottenwoods on the side hill just east of the house. The trees were four or five years old, made excellent growth and were very thrifty in former years, but this year they were one mass of rust. The cottonwoods by the creek side in the valley were apparently free from rust. I noticed a small amount on the native Aspen Poplar, but nothing very serious. So far the Russian Poplar has done exceedingly well with us here and is a better tree in every respect than the cottonwood, except perhaps when the latter is on wet land or on the side of a creek.'

Mr. D. G. Mackay writes that the cottonwood and Russian Poplars were quite free of rust at Indian Head, and were this year of particular beauty.

FODDER PLANTS.

Awnless Brome Grass.

Ever since the institution of the Experimental Farms a constant effort has been made to foster the cultivation of the Awnless Brome Grass (*Bromus inermis*, L.) in the more or less arid districts of the West. The success which has attended this effort is most gratifying. Thousands of acres of valuable hay and pasture are now being cultivated where but for this grass there would be nothing but exhausted prairie. Knowing that an actual instance is of far more value than much argument, I have requested Mr. C. W. Peterson, the Deputy Commissioner of Agriculture for the Northwest Territories, to give me an account of an experiment he tried with this grass. He is so well known and his farm being accessible to so many, his letter will do much, I feel sure, to prove the great value of this grass for the West for hay and pasture, and as a seed crop.

'Regina, November 15, 1901.—I am in receipt of your letter of the 16th ultimo, in which you ask for certain information respecting the crop of brome grass on my farm at Calgary. As you are aware, on irrigated farms in the Calgary district, the cultivated hay crops are entirely limited to timothy, for the simple reason, that you cannot dispose of brome hay in the Kootenay district. This fact, I attribute entirely to ignor-

ance on the subject and feel certain that if a few car-loads of brome hay were pressed and sent in there on trial, a market would soon be created for it. I have a knoll on my irrigated land which cannot be reached by gravity and I, therefore, decided to seed it down with grass suitable for arid districts and picked on brome. This patch covers about eight acres, or a little less. The land was seeded down in 1897, I have forgotten just now the exact quantity of seed I used per acre. It was, however, below ten pounds. I got a good sample of hay the first year and cut about a ton per acre in 1898. In 1899, I cut about a ton and three-quarters per acre, and in 1900, I cut for seed. The latter cutting yielded me 3,300 lbs. of seed, which I sold at 11 cents per pound, receiving $368.50, and as I had an abundance of feed, I sold this brome straw, 15 tons, for $3 per ton. The eight acres gave me a return of $413.50 all told.'—C. W. PETERSON.

REPORT OF THE AGRICULTURIST.

(J. H. Grisdale, B. Agr.)

Dr. Wm. Saunders,
Director Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith reports on Dairy Cattle, Beef Production, Pork Production, Sheep, and Farm Crops.

As in previous years, much of my time has been taken up attending various agricultural and live stock meetings in different parts of Canada, and, further, during the past summer I was absent 16 weeks securing a number of pure-bred cattle, sheep, and swine for the various farms under your supervision.

I am deply indebted to Mr. John Fixter, farm foreman, to Mr. C. T. Brettell, herdsman, and to Mr. J. Meilleur, dairyman, for interested and careful assistance in the various departments immediately under their charge and for help in the preparation of the submitted report.

To Mr. J. F. Watson, secretary to this division, my thanks are due for the interest and care he has displayed in the clerical work, and for the most efficient manner in which he has handled the new work of the dairy herd tests.

From December 1, 1900, to November 30, 1901, 1,470 letters were received by the Agriculturist division, and during the same period 1,533 letters were despatched.

I have the honour to be, sir,
Your obedient servant,
J. H. GRISDALE,
Agriculturist.

CATTLE.

There are on the farm at present representatives of three breeds of cattle, viz., Shorthorn, Ayrshire, and Guernsey. There are besides several grade animals of each breed ; that is, heifers or cows from a common or grade cow by a pure-bred bull of one of the above named breeds.

PURE-BRED BREEDING CATTLE.

The pure-bred cattle are as follows :—

Shorthorns.

1 bull calf, Lord Dinsdale (imp.) 6 months old.
3 cows (imp.), 3, 5 and 8 years old.
2 cows, 10 and 12 years old.
2 heifers (imp.), 1 year old.
1 calf (imp.), 4 months old.

Ayrshires.

1 bull, Twin Beauty (imp.), 2½ years old.
4 cows (imp.), 3 to 6 years old.
3 heifers (imp.), 2½ years old.
1 heifer, 1½ years old.

Guernseys.

1 bull, Wedgewood, 7 years old.
1 bull calf (imp. in dam), 5 months old.
4 cows (3 imp.), 3 to 6 years old.
1 cow, Canadian bred, 3 years old.
1 heifer, 18 months old.
1 heifer calf, 5 months old.

Most of these cattle were imported, as indicated above. Some, however, were bred by the Experimental Farms, and two cows were bred in Ontario.

The two Ontario bred cows took part in the dairy test just concluded at the Pan-American Exposition, Buffalo. One is Miss Molly, red, calved April 10th, 1889. She was bred by J. W. Rosser, Denfield, Ont., and sold to R. S. and T. E. Robson, Ilderton, Ont., from whom she was secured to take part in the above mentioned dairy test. Her dairy record was a good one, standing, as she did, first among the Shorthorns, and fifteenth among cows of all breeds. She produced in 6 months 6,894·1 pounds of milk, with an average of 3·71 per cent fat. From this milk it was estimated that 301·47 pounds of butter could have been produced. This, valued at 25 cents per pound, was worth $75.37. She cost to feed during the six months : for hay, $7.23 ; for silage, $4.96 ; for grain, $20.17, amounting to $32.36, making a net profit of $43.01 on butter alone. Besides producing such a large amount of milk, she gained in weight to the amount of 134 pounds.

The other cow, Queen Bess, red and a little white, calved October 10, 1891, was bred by James Gardiner, Farquhar, Ont. She passed into the possession of Wm. Montutle, Thames Road, Ont., from whom she was secured to become one of the herd of five dairy Shorthorns as mentioned above. Here she made a good showing, standing second in the Shorthorn herd and 34th among cows of all breeds. She produced in 6 months 6,547·9 pounds of milk, testing 3·57 per cent fat. This milk, it was estimated, contained 275·21 pounds of butter, which, valued at 25 cents per pound, was worth $68.80. She cost to feed during the 6 months, for hay, $7.21 ; for silage, $5.30 ; for grain or meal, $19.98, amounting to $32.49 in all. This left a net profit of $36.31 on butter alone. During the 6 months she gained 192 pounds in weight.

LIVE STOCK IMPORTATIONS.

June, July, and part of August was spent by the writer among the herds and flocks of Great Britain and the Channel Islands, the purpose being to study the methods of British cattle-breeders, as well as to secure a few head of pure-bred cattle, sheep, and swine for the Dominion Experimental Farms. It was decided that the cattle importation should consist of heavy milking Shorthorns, Guernseys, and Ayrshires.

Shorthorns.

The famous herds at Collynie and Tillyeairn belonging to William Duthie, of Tarves, N.B., as well as Uppermill herd, the property of W. S. Marr, were visited in the north, while those of His Majesty the King, at Windsor, of J. Deane Willis at Bapton Manor, of J. T. Hobbs, at Maisey Hampton, of Sir Nigel Kingscote, at Kingscote, and many others were seen in the south.

The animals finally purchased are :—*Lord Dinsdale*. bull, dropped June, 1901, was so unfortunate as to lose his dam a few weeks after his birth and has had since to depend on the pail for his upbringing. In spite of his troubles he has done well and offers to make a fine animal. He is a light roan with an abundance of thick mossy hair, lots of style, strong lines and, for one of his age, grand masculine character. He is from the long established Berkeley Castle herd, the property of Lord Fitzhardinge, at Berkeley, Gloucestershire. This herd is under the able management of

1. Leicester Ewe. 2. Leicester Ram Stanisson. 3. Leicester Lambs.
4. Shropshire Ram (Imp. Minton bred). 5. Shropshire Ewe (Imp. Mansell bred).
6. Shropshire Lambs (Imp. Mansell bred).

James Peter, the famous judge of Shorthorns. Bates blood runs in every strain there, and no expense has been spared to secure the best, both as to character and pedigree. Lord Dinsdale's dam, a light red of unusual scale, was a very heavy milker from a very heavy milker ; his sire has also good breeding for milk production.

Lunesdale Marchioness.—A magnificent roan, dropped in November, 1896, and the dam of two beautiful heifers, is in calf to Land's End. She has a good record as a milk producer, and it is hoped to found a deep-milking family with her off-spring.

This cow, as well as Illuminata mentioned below, were bred by Edmund Potter, Esq., Lowfields, Kirkby Lonsdale, Westmoreland. Mr. Potter's herds have been bred for years as general purpose cattle and any cows not good milk producers are weeded out after the first calf. His cattle are a wonderfully uniform lot, sweet, smooth and well fleshed.

Illuminata.—A deep fleshed red, dropped in 1899, is from the heavy-milking cow Lustre, and is in calf to Land's End.

From the herds of Mr. Scott Murray, Hambleden, Henley-on-Thames, was secured the deep-milking cow *Darlington Lass*. She has a well-established milk record, and puts all her feed into the pail. She is in calf to *Hopeful Lad*, and something good is hoped for.

Jessica Elmhurst.—Dropped in July, 1901, is from the same herd and from the best cow of the herd. She is a dark red and is faultless in Shorthorn character and conformation.

Janet.—A light roan cow calf, dropped in October, 1900, is a sweet, smooth, deep-ribbed, well-fleshed, broad-fronted and strong-backed animal from Jubilee, by Union Jack. The dam is 13 years old and a cow of superior milking properties, and better Shorthorn characteristics is hard to imagine. Ten months after dropping the calf Janet she was still yielding 35 pounds ($3\frac{1}{2}$ gallons) of milk daily. She is the great dairy Shorthorn of the famous Duffryn Dairy Shorthorn herd. This herd, the property of Richard Stratton, Esq., The Duffryn, Newport, Mon., has been famous in the show ring and dairy tests for over forty years, and still holds its own, as witness the first prize yearling heifer at the Royal Agricultural Society show at Cardiff this year, bred and owned by Mr. Stratton.

From Jas. A. Peter, Esq., Berkeley, Glos., the roan cow calf, *Duchess of Vittoria 39th*, was secured. Though not so deep-fleshed nor having quite such good lines as Janet, she is probably of a sweeter Shorthorn type and is worthy of her Duchess descent, tracing back, as she does, to the famous Bates Duchesses and Waterloos. She is by North Star from Duchess of Vittoria 34th, a strong, heavy-milking red cow.

Guernseys.

A large number of Guernsey herds were visited in England, and finally a selection of a bull and three cows was made from probably the premier Guernsey herd of England, that of Lady Tichborne, Tichborne Park, Alresford, Hants, managed by David Michie, Esq.

The bull, Golden Rule, an orange fawn, dropped in 1899, has every indication of being a good sire. He has been sent to the experimental farm at Nappan, N.S., as well as Itchen Lady, a rather plain little cow of fairly good milking points.

Clatford Spot, a strong, deep coloured animal, is to represent the breed at the experimental farm at Indian Head, N.W.T., while Lily of Alderney, a finer-boned, lighter-coloured and rather more milk producing type of animal, will remain at the Central experimental farm.

Two cows were secured on the Island of Guernsey, where several days were spent among the herds. The cows selected were Honoria VIII a light fawn, white spots, dropped 1898, and in calf to Francis Masher II. She was bred by Alfred Lepatourel, Esq., La Ramee, Guernsey. In mid-Atlantic she dropped a bull calf, which offers to make a fine animal. Coming as he does from a cow of such beautiful Guernsey quality and deep-milking properties as Honoria VIII., by a sire so famous as Francis Masher II. much is hoped for.

Deanie IX., bred by T. R. Gallienne, was dropped 1898. She made a good milk record with her first calf and is from a most excellent dairy cow. She is a light fawn with white, and is a good dairy type. She is rather plain at the til, however, and was bought for performance rather than appearance.

Ayrshires.

Before any individuals of this breed were secured several of the best herds in Scotland were visited, and notes made of their chief characteristics.

It was finally decided to buy from Mr. Andrew Clement, of Glasgow, the bull Twin Beauty. This bull, brown with white spots, was dropped in 1899. He was bred by Robert Wallace, Esq., Auchenbrain, Mauchline. His dam, Old Beauty's Last, has a record of over 70 lbs. of milk in one day on grass alone. He is by Daniel of Auchenbrain, whose dam has a record quite equal to Old Beauty's Last. These two wonderful cows were still at Auchenbrain in August, and cows more nearly ideal in type can scarce be imagined.

Mr. Andrew Clement, from whom the bull was secured, is an enthusiastic Ayrshire breeder, and at great inconvenience to himself rendered invaluable services in the search for the right class of animal.

From Mr. Wallace, Auchenbrain, were secured 4 excellent two year old heifers by the famous bull Daniel of Auchenbrain, now in Australia.

From Mr. Robert Woodburn, Holehouse, Galston, were secured three cows : Nora's Last, a stylish, deep milking, good teated animal, 6 years old, Rosy, a good milking cow of a rather less striking appearance, and Soncy, a trim, neat, sweet and tidy little animal with good dairy points. Soncy goes to Nappan, with one of the Wallace heifers.

Culcaigrie.—From the hills of Galloway were brought two cows, among the best in all that land, Jessie A., of Culcaigrie and Maggie of Culcaigrie.

Jessie A. was the winner of the famous Queen's Hill cup, now the property of her breeder, he having won it three times. Maggie also took part in the winning of this beautiful trophy for her one-time owner, William Stroyan, Esq., Culcaigrie, Twynholm, Kirkcudbright.

Jessie A. is a cow of grand proportions, beautiful lines, great strength and splendid Ayrshire character. She stands a queen among dairy cattle anywhere. Maggie is smaller and something weaker, but withal has good lines, is clean cut, and is going to be a worker, as well as a thing of beauty.

DAIRY CATTLE.

The herd of dairy cattle during 1901 consisted of 29 females all told. They are:—

MILKING STOCK.

Ayrshires	1
Guernseys	1
Ayrshire grades	9
Canadian grades	2
Shorthorn grades	4
Guernsey grades	2

YOUNG STOCK.

Shorthorn grades—	
Two year olds	2
Calves	1
Ayrshire grades—	
Two year olds	2
Calves	1

Guernsey grades—

Two year olds	1
Calves	3

On the arrival of the imported stock, several grade dairy cows were sold to make room for the new animals. Such aged cows and young cattle were retained as were fairly good representatives of grades of the breeds, Shorthorn, Ayrshire and Guernsey.

FEED OF THE DAIRY CATTLE.

The roughage ration fed during the year of 1901 was practically the same as that fed in 1900, namely, 35 lbs. ensilage, 20 lbs. mangels, 5 lbs. clover hay, and a little chaff. This ration was varied to suit the size or capacity of the cow. The meal ration consisted of different mixtures at different times. Bran, oat chop, barley meal, and pea meal made up a considerable portion of the grain ration, but gluten entered very extensively into the concentrate ration during the winter months.

GLUTEN MEAL.

This feed is proving of great value as a milk producer. It appears to be suited for winter dairying, as it forms a good supplementary ration for mangels or corn ensilage. It is open at present to the objection that it is not constant in composition. It is apparently difficult to get two samples even from the same factory alike in protein or fat content, while feeds under the same name from different factories are quite different in appearance and vary in protein and fat content by as much as 20 per cent. This uncertainty of composition is very objectionable and must be guarded against most carefully.

MILK YIELD.

The average milk yield of the herd has increased from 6,455 lbs. in 1900 to 6,760 lbs. in 1901. The butter yield per cow for 1900 was 289·6 lbs., while in 1901 each cow made 319 lbs., an increase of 29·4 lbs.

SUMMER FEEDING.

The dairy cattle during the first part of the summer were, as usual, pastured on the fifth year of the rotation ; that is, on land from which one year's hay had been cut. In August and September they were allowed to have part of the clover meadow aftermath of the fourth year of the rotation. In addition to this they were given some clover ensilage, (see page 302). Only a small amount of meal (3 lbs. ground oats per cow) was fed to such as were giving a large flow of milk and to heifers in the first period of lactation.

In estimating the cost of feeding, the following prices were charged for feed stuffs, being the average local market rates for the same during 1901, save in the case of ensilage and roots, which are charged at the usual values affixed in experimental work :—

Pasture	$ 2.00	per cow per month.
Bran	15.00	per ton.
Oats, gluten meal, barley and pease	19.00	"
Clover hay	6.00	"
Chaff	4.00	"
Roots and ensilage	2.00	"

In estimating the value of the product, 19 cents per pound is allowed for the butter and 15 cents per hundred pounds for the skim milk and butter-milk. The butter is manufactured in the farm dairy and sells on the market at from 22 to 30 cents per pound, an average of 25 cents during the year. This leaves 6 cents per pound for cost of manufacture.

The following tables give in detail the particulars concerning each cow and the herd statement for the month :—

REPORT OF DAIRY HERD.

Number.	Name of Cow.	Breed.	Age.	Date of dropping last calf.	Number of Days in Milk in 1901.	Daily Average of Milk.	Total Milk for Year.	Per cent of Butter Fat.	Pounds Butter.	Value of Butter at 19 cents per lb.	Value of Skim Milk at 15 cts. per 100 lbs.	Total Value of Products.	Cost of Feed.	Profits.	Remarks
						Lbs.	Lbs.			$ cts.	$ cts.	$ cts.	$ cts.		
1	Julia	Ayrshire Grade		Dec. 26, 1900.	320	36·6	11,707	3·60	496	94 24	16 50	110 74	42 82	67·92	
2	Dora	"		Jan. 17, 1901.	300	33·0	9,893	3·40	396	75 24	13 80	89 04	42 80	46·24	
3	Bell	"		Feb. 14, 1901.	283	33·7	9,536	3·90	438	83 22	13 50	96 72	40 57	56·15	
4	Bloom	"		Nov. 11, 1900.	342	27·0	9,252	3·80	414	78 66	13 05	91 71	43 99	47·72	
5	Della	Shorthorn Grade		Jan. 20, 1901.	280	27·7	7,769	4·00	366	69 54	10 65	80 19	40 85	39·34	
6	Laura	Ayrshire "		Nov. 2, 1900.	300	25·5	7,668	3·50	316	60 04	10 50	70 54	32 70	37·84	
7	Begonia	Canadian "		April 7, 1901.	290	26·2	7,598	3·60	322	61 18	10 50	71 68	33 45	38·23	
8	Countess	Ayrshire "		Jan. 6, 1901.	310	24·2	7,527	4·00	354	67 26	10 25	77 51	40 00	37·51	
9	Florence	Shorthorn "		April 2, 1901.	320	21·7	6,940	4·10	335	63 65	9 60	73 25	35 25	38·00	
10	Polly	Ayrshire "		Dec. 7, 1900.	295	22·8	6,750	4·30	341	64 79	9 20	73 99	36 42	37·57	
11	Dairymaid	Shorthorn "		Mar. 15, 1901.	270	24·6	6,640	3·90	305	57 95	9 00	66 95	33 42	33·53	
12	Darling	Ayrshire.		Oct. 8, 1900.	300	21·1	6,330	4·50	335	63 65	8 60	72 25	26 42	45·83	
13	Bellflower	Guernsey Grade		Jan. 17, 1901.	305	20·3	6,216	4·50	329	62 51	8 50	71 01	36 85	34·16	
14	Forest Girl	Shorthorn "		" 1, 1901.	280	22·0	6,170	3·60	261	49 59	8 50	58 09	38 45	19·64	
15	Queenie	Guernsey "		Dec. 28, 1900.	320	16·7	5,363	5·70	360	68 40	7 35	75 75	30 30	45·45	
16	Winnie	Ayrshire "		Jan. 4, 1901.	225	22·1	4,974	4·20	246	46 74	6 75	53 49	35 30	18·19	
17	Ruby	Guernsey		Aug. 10, 1901.	270	13·8	3,740	5·40	238	45 22	4 80	50 02	33 43	16·59	
18	Hazel	Canadian Grade		July 16, 1900.	170	18·3	3,116	4·10	150	28 50	4 05	32 55	38 06	−5·51	Loss.
19	Dewdrop	Ayrshire "		" 10, 1901.	100	12·5	1,258	4·10	60	11 40	1 80	13 20	8 45	4·75	
					5,280	24·3	128,447	4·01	6,062	1,151 78	176 90	1,328 68	669 53	659·15	Aggregates.
					278	24·3	6,760	4·01	319	60 62	9·31	69 93	35 24	34·69	Averages.

MONTHLY STATEMENTS.

—	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	Total.
No. of cows giving milk.	17	19	17	17	17	17	16	16	16	16	14	16	
Lbs. of milk in month......	7,657	9,989	11,073	13,552	13,530	14,191	13,991	13,440	12,076	9,525	7,277	6,262	132,563
Average for 1 day........	247	322	395	437	451	458	466	433	389	308	234	209	
Daily average per cow.....	$14\frac{1}{2}$	17	23	26	$26\frac{1}{2}$	27	29	27	24	$19\frac{3}{4}$	17	13	
Per cent fat...	4·40	4·32	4·22	4·16	4·28	4·37	4·16	4·15	4·08	4·55	4·45	4·47	
Lbs. butter fat	336·90	431·52	467·28	563·76	579·08	620·14	582·02	557·76	492·70	433 38	323·82	279·91	5668·32
Lbs. butter...	396·35	507·66	549·73	663·25	681·27	729·57	684·73	656·19	579·65	509·86	380·96	329·31	6668·61
Lbs. of milk for 1 lb. butter...	19·3	19 6	20·1	20 5	20·2	19 4	20·4	20·5	20 8	18·7	19·1	19·0	

EXPERIMENTS WITH DAIRY CATTLE

As stated elsewhere, a number of Shorthorns, Ayrshires and Guernseys were imported in 1901. The females, with the addition of a few grades of each breed already in the stables, will make up the dairy herds for 1902, and some succeeding years.

There will be three distinct herds with a subdivision in each as follows: Shorthorn herd, and Shorthorn grades; Ayrshire herd, and Ayrshire grades; Guernsey herd, and Guernsey grades. Account will be taken of the produce in calves and milk in both pure-bred and grade herds. A strict account will be kept of the food consumed by each individual animal.

Experiments during the past year have been carried on along two lines; to determine the effect of milking at unequal intervals and to gain some information as to the comparative value of some different rations fed in different ways. Reports on these follow :—

HOURS OF MILKING.

The experiment to ascertain the influence of hours of milking upon the amount of milk produced, and upon the quality of the same has been continued, and three separate experiments are summarized in the tables which follow.

The cows are usually milked here at 6 o'clock a.m. and 4.30 p.m. When milked at equal intervals during the experiment the hours were 6 a.m. and 6 p.m. By 'Period of change' in the following tables is meant the week succeeding the change of milking hour from 4.30 p.m. to 6 p.m. in order to make the intervals between milkings of equal lengths or *vice versa.*

Average.	Average for previous 10 days.	First period of change.	Milking equal intervals.	Second period of change.	Milking unequal intervals.	Remarks.
DARLING.—Autumn Test.						
Per cent of fat, morning	3·5	3·80	3·78	3·87	3·56	
" " evening	3·9	3·61	3·75	4·35	4·21	
" " whole day	3·7	3·71	3·76	4·18	3·86	
Daily average yield butter fat	1·061 lbs.	1·037 lbs.	0·988 lbs.	1·102 lbs.	0·993 lbs.	
HAZEL.—Autumn Test.						
Per cent of fat, morning	3·9	4·70	4·46	4·41	4·17	
" " evening	4·1	4·27	4·41	4·51	4·55	
" " whole day	4·0	4·49	4·43	4·46	4·36	
Daily average yield butter fat	0·960 lbs.	1·055 lbs.	0·923 lbs.	0·903 lbs.	0·889 lbs.	
RUBY.—Autumn Test.						
Per cent of fat, morning	4·5	5·75	6·27	5·68	5·45	
" " evening	4·9	5·65	6·20	6·35	6·26	
" " whole day	4·7	5·70	6·24	6·01	5·85	
Daily average yield butter fat	0·654 lbs.	0·627 lbs.	0·664 lbs.	0·578 lbs.	0·608 lbs.	
THERESA.—Autumn Test.						
Per cent of fat, morning	3·5	3·70	4·83	4·57	4·46	
" " evening	3·9	4·36	4·70	4·82	4·71	
" " whole day	3·7	4·03	4·76	4·69	4·58	
Daily average yield butter fat	0·662 lbs.	0·585 lbs.	0·576 lbs.	0·672 lbs.	0·616 lbs.	
DARLING.—Winter Test.						
Per cent of fat, morning	4·0	4·2	4·0	3·7	3·8	
" " evening	4·0	4·5	4·1	4·1	4·1	
" " whole day	4·0	4·35	4·05	3·9	3·95	
Daily average yield butter fat	1·000 lbs.	1·073 lbs.	1·051 lbs.	1·02 lbs.	1·002 lbs.	
DORA.—Winter Test.						
Per cent of fat, morning	3·3	3·6	3·3	3·2	3·2	
" " evening	3·4	3·8	3·3	3·5	3·4	
" " whole day	3·35	3·7	3·3	3·35	3·3	
Daily average yield butter fat	1·474 lbs.	1·695 lbs.	1·133 lbs.	1·524 lbs.	1·076 lbs.	
DEWDROP.—Winter Test.						
Per cent of fat, morning	4·3	5·0	4·7	4·2	4·3	
" " evening	4·6	5·3	4·5	4·4	4·6	
" " whole day	4·45	5·15	4·6	4·3	4·45	
Daily average yield butter fat	·489 lbs.	·511 lbs.	·468 lbs.	·464 lbs.	·401 lbs.	
COUNTESS.—Winter Test.						
Per cent of fat, morning	3·5	3·6	3·7	3·6	3·6	
" " evening	3·7	3·8	3·5	4·0	4·0	
" " whole day	3·6	3·7	3·6	3·8	3·8	
Daily average yield butter fat	1·008 lbs.	1·011 lbs.	1·014 lbs.	1·166 lbs.	1·002 lbs.	

Average.	LAURA—Winter Test.					Remarks.
	Average for previous 10 days.	First period of change.	Milking equal intervals.	Second period of change.	Milking unequal intervals.	
Per cent of fat, morning......	3·6	3·8	3·5	3·4	3·4	
" evening......	3·6	3·8	3·5	3·5	3·7	
" whole day.....	3·6	3·8	3·5	3·45	3·55	
Daily average yield butter fat...	1·044 lbs.	1·072 lbs.	·983 lbs.	1·010 lbs.	1·010 lbs.	
	DAHLA.—Winter Test.					
Per cent of fat, morning........	3·8	4·0	3·8	3·9	3·8	
" evening........	3·9	4·1	3·9	4·0	4·0	
" whole day......	3·85	4·05	3·85	3·95	3·9	
Daily average yield butter fat...	·988 lbs.	·940 lbs.	·838 lbs.	·982 lbs.	·919 lbs.	
	DAIRYMAID.—Summer Test.					
Per cent of fat, morning.......	4·2	4·5	4·5	4·5	4·9	
" evening....	4·4	4·5	4·6	5·1	5·3	
" whole day.. ..	4·3	4·5	4·55	4·8	5·1	
Daily average yield butter fat...	·860 lbs.	1·176 lbs.	1·022 lbs.	·849 lbs.	·895 lbs.	
	BLOOM.—Summer Test.					
Per cent of fat, morning........	3·8	3·5	3·7	3·6	3·8	
" evening.........	4·2	3·7	3·7	4·2	4·1	
" whole day	4·0	3·6	3·7	3·8	3·95	
Daily average yield butter fat...	·640 lbs.	1·041 lbs.	·925 lbs.	·907 lbs.	·655 lbs.	
	BELLFLOWER.—Summer Test.					
Per cent of fat, morning	4·2	4·3	4·4	4·3	4·6	
" evening.........	4·4	4·2	4·2	4·9	5·1	
" whole day.....	4·3	4·25	4·3	4·6	4·85	
Daily average yield butter fat...	·989 lbs.	·902 lbs.	·819 lbs.	·815 lbs.	·815 lbs.	
	BEGONIA.—Summer Test.					
Per cent of fat, morning........	3·2	3·6	3·6	3·4	3·5	
" " evening.........	3·6	3·8	3·6	3·5	4·1	
" " whole day........	3·4	3·7	3·6	3·45	3·8	
Daily average yield butter fat...	1·292 lbs.	1·262 lbs.	1·059 lbs.	·907 lbs.	1·134 lbs.	
	FLORENCE.—Summer Test.					
Per cent of fat, morning........	3·4	3·7	3·9	3·7	3·9	
" " evening.........	3·6	3·9	3·9	4·1	4·4	
" " whole day......	3·5	3·8	3·9	3·9	4·15	
Daily average yield butter fat...	·875 lbs.	·877 lbs.	·863 lbs.	·833 lbs.	·801 lbs.	
	BELL.—Summer Test.					
Per cent of fat, morning........	3·8	4·0	3·9	3·6	3·9	
" " evening.........	4·2	3·9	3·9	4·3	4·3	
" " whole day.. ..	4·0	3·95	3·9	3·95	4·1	
Daily average yield butter fat...	1·160 lbs.	1·283 lbs.	1·190 lbs.	1·108 lbs.	1·018 lbs.	

A study of the above records would tend merely to emphasize the conclusions reached in last year's experiment, namely :—

1. That the percentage of butter fat in milk, from morning or evening milking, is influenced by the comparative length of interval between the milking hours.

2. The richer milk is found to be produced after the shorter interval.

3. Where intervals between milkings are equal, no appreciable difference appears to exist in either the quality or quantity of the milk drawn in the morning or in the evening.

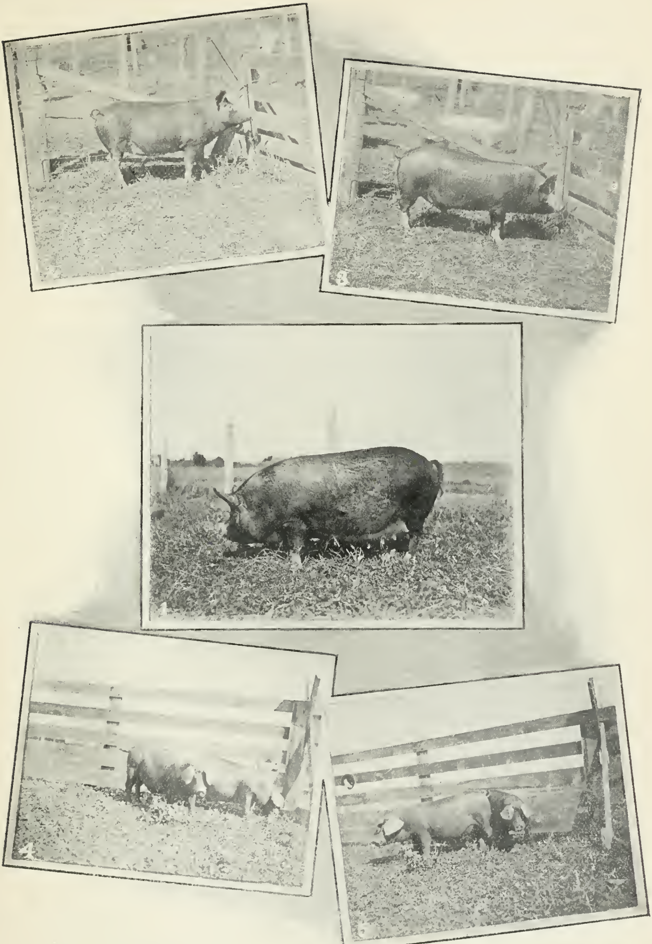
Periods of change in hours of milking are evidently periods of excitement and affect individuals differently.

COW FEEDING EXPERIMENT.

DRY VERSUS WET FEED.

Feeding cows barley, oats and oil meal dry versus bran and gluten meal wet.

As a study of the tables will reveal, the two lots of cows of three each were fed for seven days on similar rations. On the eighth day the rations were changed, both lots being fed ensilage and hay, but lot 1 being given a meal ration of barley, oats and oil meal, fed dry, and lot 2 a meal ration of bran and gluten feed, fed wet. These rations were continued for 14 days, when the rations were interchanged between the lots of cows. The results from equally good rations should with such an interchange of rations have been quite similar. The results show a considerable difference however. As a study of the following tables will show, the ration fed wet gave a daily aggregate of 114 pounds milk testing 3·83 per cent butter fat, equivalent to 4·365 pounds butter fat, while the same cows, fed on the dry ration, gave 116½ pounds milk, testing 3·99 per cent butter fat, equivalent to 4·627 pounds butter fat, an increase of 2½ pounds of milk, of ·16 per cent butter fat, and of ·262 pounds butter fat, an increase of 6 per cent in favour of dry feed.



1. Berkshire Sow (Imp.) 2. Tamworth Sow (Imp.) 3. Berkshire Boar (Imp.)
4. Large Black Boars (Imp.) 5. Large Black Sows (Imp.)

COW FEEDING EXPERIMENT.

Dry Barley, Oats and Oil Meal versus Bran and Gluten fed wet.

	Daily Ration.	Date.		Julia. Morning. Milk.	Julia. Morning. Fat.	Julia. Morning. B. Fat	Julia. Evening. Milk.	Julia. Evening. Fat.	Julia. Evening. B. Fat	Begonia. Morning. Milk.	Begonia. Morning. Fat.	Begonia. Morning. B. Fat	Begonia. Evening. Milk.	Begonia. Evening. Fat.	Begonia. Evening. B. Fat	Bell. Morning. Milk.	Bell. Morning. Fat.	Bell. Morning. B. Fat	Bell. Evening. Milk.	Bell. Evening. Fat.	Bell. Evening. B. Fat	Total for Day. Milk.	Total for Day. Average Fat	Total for Day. Butter Fat.
				Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs.	p. c.	Lbs.
Lot 1 Period 1.	Corn ensilage, 40 lbs	Oct.	17	14½	3·4	·49	10½	3·4	·35	13½	3.4	·45	10	4·0	·40	14½	3·4	·49	10½	3·8	·39	73½	3·56	2·57
	Clover hay 2 "	"	18	15	3·2	·48	10½	3·6	·37	12½	2.8	·35	10½	4·0	·42	15	3·8	·57	10	4·0	·40	73½	3·56	2·59
	Bran 4 "	"	19	15	3·4	·51	10½	4·0	·42	12½	3·1	·38	11	4·0	·44	15	3·6	·54	10	4·2	·42	74	3·71	2·71
	Oats 1 "	"	20	15	3·3	.49	10½	3·8	·39	12½	2·9	·36	10	4·1	·41	15½	4·0	·62	10	4·4	·44	73½	3·75	2·71
	Gluten 2 "	"	21	15	3·1	·46	10½	3·6	·37	12½	3·2	·40	10½	4 2	·44	15½	3·6	·55	10	4·5	·45	74	3 7	2·67
	Pumpkins 15 "	"	22	15	3·3	·49	10½	3·8	·39	12½	3·1	·38	10	3·9	·39	15½	3 7	·57	10	4·8	·48	73½	3·76	2·70
		"	23	15	3·2	·48	11	3·6	·39	12½	3·5	·43	10½	4·0	·42	15	3·1	·46	10½	4·1	·43	74½	3 58	2·61
	Total			104½	3·3	3·40	74	3·7	2·68	88½	3·1	2·75	72½	4·0	2·92	106	3·6	3·80	71	4·3	3·01	516½	3·59	18·56
Lot 1 Period 2.		Oct.	24	15	3·4	·51	11	4·0	·44	12½	3·3	·41	10½	4·2	·44	15½	3·8	·58	10½	4·4	·46	75	3·85	2 84
		"	25	15	3·2	·48	10½	4·0	·42	13	3·3	·42	10	4·1	·41	16	4·0	·64	10½	4·4	·46	75	3·83	2·83
		"	26	15	3·3	·49	10½	3·6	·37	13	3·2	·41	10	4·0	·40	15½	3·8	·58	10½	4·4	·46	74½	3·71	2·71
		"	27	15	3·2	·48	10	3·4	·34	13	2·8	·36	12	4·1	·49	15	3·7	·55	9	3·4	·30	74	3·43	2·52
	Corn ensilage, 40 lbs	"	28	15½	3·2	·49	10½	3·8	·39	13	3·2	·41	11½	3·6	·41	16	3·9	·62	9½	4·2	·39	76	3·65	2·71
	Clover hay 2 "	"	29	15	3·4	·51	10½	3·9	·41	13	2·9	·37	11	4·0	·44	15	3·2	·48	10½	5·0	·52	75	3·73	2·73
	Meal mixture { Barley, 3 lbs	"	30	15	3·4	·51	10½	4·1	·43	13	2·8	·36	10½	4·2	·44	15	3·5	·52	10½	4·6	·48	74½	3·76	2·74
	Oats 4 "	"	31	15	3·6	·54	10½	3·9	·41	12½	3·4	·42	10½	4·4	·46	14½	3·8	·55	10½	3·7	·38	73½	3·8	2·76
	Oil meal 2 "	Nov.	1	15	3·3	·49	10½	4·0	·42	13	3·4	·44	11½	4·3	·49	15	3·6	·54	10	3·9	·39	75	3·75	2·77
	Meal fed dry and all they would stand	"	2	15	3·4	·51	10½	3·8	·39	13	3·5	·45	11	4·2	·46	14½	3·8	·55	9½	4·4	·41	73½	3·85	2·77
		"	3	14½	3·4	·49	10½	3·6	·37	13	3·0	·39	11	4·2	·46	14½	4·0	·58	9½	4·2	·39	73	3·73	2·68
		"	4	14½	3·4	·49	10½	4·0	·42	13	3·5	·45	11½	4·0	·46	14½	4·2	·60	10	4·4	·44	74	3·91	2·86
		"	5	14½	3·4	·49	11	3 8	·41	13	3·1	·40	11	4·7	·51	14½	4·0	·58	10	4·2	·42	74	3·87	2·81
		"	6	14½	3·6	·52	11	3·4	·37	13	3·4	·44	11½	3·9	·44	15	3·8	·57	10½	3·8	·39	75½	3·66	2 73
	Total			208½	3·4	7·00	148	3·8	5·59	181	3·2	5·73	153½	4·1	6·31	210½	3·8	7·94	141	4·2	5·89	1,042½	3·69	38·46

COW FEEDING EXPERIMENT—*Concluded.*

Dry Barley, Oats and Oil Meal versus Bran and Gluten fed wet.

	Daily Ration.	Date.	Cows.																		Total for Day.		
			Bloom.						Della.						Florence.								
			Morning.			Evening.			Morning.			Evening.			Morning.			Evening.					
			Milk.	Fat.	B. Fat	Milk.	Fat.	B. Fat	Milk.	Fat.	B. Fat	Milk.	Fat.	B. Fat	Milk.	Fat.	B. Fat	Milk.	Fat.	B. Fat	Milk.	Average Fat	Butter Fat.
			Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs	p. c.	Lbs	Lbs.	p. c.	Lbs.
		Nov. 7	14	3·3	·46	10	3·6	·36	12½	3·0	·37	11	3·4	·37	14½	4·0	·58	9½	4·0	·38	71½	3·71	2·52
		" 8	14½	3·4	·49	10½	3·8	·39	13	2·8	·36	10½	3·4	·35	14½	3·4	·49	10	4·0	·40	73	3·46	2·48
		" 9	14½	3·2	·46	10½	3·8	·39	13	3·0	·39	11	3·9	·42	14	3·6	·50	10	3·6	·36	73	3·51	2·52
		" 10	14	3·2	·44	10	3·8	·38	12	3·0	·36	11	4·0	·44	14	3·6	·50	9½	4·0	·38	70½	3·6	2·50
		" 11	14	3·2	·44	10	3·7	·37	12	3·0	·36	10	4·0	·40	13	3·2	·41	9	3·9	·35	68	3·5	2·33
	Corn ensilage, 40 lbs	" 12	13½	3·1	·41	9½	3·8	·36	12½	3·0	·37	9½	4·0	·38	13	3·4	·44	9	4·3	·38	67	3·6	2·34
	Clover hay 2 "	" 13	13½	3·5	·48	9½	3·8	·36	12½	3·3	·41	10	3·8	·38	13	3·5	·45	10	4·4	·44	68½	3·71	2·52
Lot 1 Period 3.	Meal mixture {Gluten, 3 lbs	" 14	12½	3·4	·42	9	3·9	·35	12	3·2	·38	9	4·0	·36	11½	4·0	·46	9	4·0	·36	63	3·75	2·33
	{Bran 5 "	" 15	13	3·4	·44	9	3·8	·34	12½	3·3	·41	9	4·0	·36	12½	4·0	·50	9	3·9	·35	65	3·73	2·40
	Meal fed wet and all they would stand	" 16	12½	3·3	·41	8½	3·6	·30	12	3·2	·38	9	3·8	·34	12½	3·9	·48	8	4·1	·32	62½	3·65	2·23
		" 17	12½	3·0	·37	7½	3·8	·28	12½	3·0	·37	9	3·7	·33	12½	3·6	·45	8	4·0	·32	62	3·51	2·12
		" 18	12	3·1	·37	8½	3·8	·32	12	3·2	·38	9½	3·6	·33	13	3·6	·46	8½	4·0	·34	63½	3·55	2·20
		" 19	12	3·0	·36	8½	3·6	·30	12½	3·1	·38	9	3·7	·33	12½	3·8	·47	8½	4·0	·34	63	3·53	2·18
		" 20	12	3·2	·38	8½	3·6	·30	12½	3·1	·38	9	3·7	·33	12	3·7	·44	8½	4·0	·34	62½	3·55	2·17
	Total		184½	3·2	5·93	129½	3·7	4·80	173½	3·1	5·30	136½	3·8	5·12	182½	3·7	6 63	126½	4·0	5·06	933	3·52	32·84
	Corn ensilage, 40 lbs	Oct. 17	10	3·6	·36	7	4·4	·30	10½	4·4	·46	8	4·8	·38	9½	3·6	·34	7	4·2	·29	52	4·16	2·13
	Clover hay, 2 "	" 18	10	3·8	·38	7½	4·0	·30	10	4·3	·43	8	4·8	·38	10	4·0	·40	7½	4·6	·34	53	4·25	2·23
	Bran, 3 "	" 19	10½	3·8	·39	7½	4·4	·33	10	4·4	·44	8	4·8	·38	10	3·8	·38	7½	4·6	·34	53½	4·3	2·26
Lot 2 Period 1.	Oats, ¾ "	" 20	10	4·0	·40	7	4·0	·28	10	4·0	·40	8	5·0	·40	10	3·9	·39	7	4·4	·30	52	4·21	2·17
	Gluten, 1½ "	" 21	10½	3·6	·37	6½	4·4	·28	10	4·3	·43	8	5·0	·40	10	4·0	·40	7	4·9	·34	52	4·37	2·22
	Pumpkins, 15 "	" 22	9	4·6	·41	6½	4·4	·28	10	4·4	·44	8	5 0	·40	10	4·2	·42	6½	4·8	·31	50	4·56	2·26
		" 23	9	3·8	·35	7	4·0	·28	10	4·3	·43	8	4·6	·36	9	4·0	·36	6½	4 6	·29	49½	4·21	2·07
	Total		69	3·8	2·66	49	4·2	2·05	70½	4·3	3·03	56	4·8	2·70	68½	3·9	2·69	49	4·6	2·21	362	4·23	15·34

Lot 2 Period 2.		Oct. 24	9½	3·8	·36	7	4·0	·28	10	4·3	·43	7½	4·6	·34	9½	3·9	·37	6½	4·4	·28	50	4·16	2·06
		" 25	10½	3·6	·37	7½	4·0	·30	11	3·9	·42	8	4·6	·36	9½	4·0	·38	6½	4·3	·27	53	4·06	2·10
		" 26	10	3·7	·37	7	3·8	·26	11	3·9	·42	7½	4·7	·35	9	4·0	·36	6½	4·4	·28	51	4·08	2·04
		" 27	9½	3·6	·34	6½	3·6	·23	11	3·9	·42	7½	4·4	·33	9½	4·0	·38	5½	6·2	·34	49½	4·28	2·04
	Corn ensilage, 40 lbs.............	" 28	9	3·6	·32	6½	4·1	·26	11	3·8	·41	7½	4·8	·36	8½	3·9	·33	6½	4·8	·31	49	4·2	1·99
	Clover hay, 2 "	" 29	8½	4·0	·34	6	4·2	·25	10½	4·2	·44	7½	4·1	·33	8	4·4	·36	6½	4·6	·29	47	4·3	2·01
	Meal mixture { Bran, 5 "	" 30	8	3·6	·28	6	4·4	·26	10½	4·0	·42	7	5·0	·35	8	4·0	·32	5½	4·8	·26	45	4·3	1·89
	Meal mixture { Gluten 3 "	" 31	8	3·8	·30	6	4·2	·25	10½	4·7	·49	7	5·1	·35	8	4·4	·36	6	4·7	·28	45½	4·48	2·03
	(Meal fed wet and all they would stand.)	Nov. 1	8	4·0	·32	6	4·3	·25	10½	4·4	·46	7	5·0	·35	8½	4·2	·33	6	4·8	·28	46	4·45	1·99
		" 2	8	4·1	·32	8	4·2	·33	10½	4·6	·48	7	4·7	·32	8½	4·4	·37	6	4·4	·26	48	4·4	2·08
		" 3	9½	3·8	·36	8	4·2	·33	10½	4·1	·43	7	4·6	·32	8½	4·2	·33	6	4·9	·29	49½	4·3	2·06
		" 4	8	4·0	·32	6	4·8	·28	10½	4·4	·46	7½	5·0	·37	8½	3·8	·32	6	4·8	·28	46½	4·3	2·03
		" 5	8	4·2	·33	6	4·4	·26	11	4·4	·48	8	5·0	·40	8½	4·1	·34	6½	4·4	·28	48	4·41	2·09
		" 6	8	4·4	·35	6	4·4	·26	11	4·5	·49	8	4·6	·36	9	4·2	·37	6	4·4	·26	48	4·41	2·09
	Total....................	....	122½	3·9	4·68	92½	4·2	3·80	149½	4·2	6·25	104	4·5	4·89	121½	4·1	4·92	86	4·7	3·96	676	4·21	28·50
Lot 2 Period 3.		Nov. 7	8	4·2	·33	5½	4·2	·23	10½	4·4	·46	7½	4·6	·34	9	4·4	·39	6	4·6	·27	46½	4·4	2·02
		" 8	7½	4·2	·31	5½	4·2	·23	10½	4·2	·44	7	4·5	·31	9	4·2	·37	6	4·8	·28	45½	4·35	1·94
		" 9	7½	4·4	·33	5	4·2	·21	10½	4·7	·49	7½	5·4	·30	9	4·6	·41	6	5·0	·30	45½	4·71	2·04
	Corn ensilage, 40 lbs	" 10	7	4·5	·31	5	4·9	·24	10	4·7	·47	7	5·1	·35	9	4·4	·39	6	4·8	·28	44	4·73	2·04
	Clover hay 2 "	" 11	7	4·3	·30	5	4·8	·24	10½	4·9	·51	6	5·2	·31	9	4·9	·44	7	4·9	·34	44½	4·83	2·14
	Meal mixture { Barley, 3 "	" 12	7	4·2	·29	5	4·8	·24	8½	4·9	·41	7	5·8	·40	10	5·0	·50	6	5·1	·30	43½	4·96	2·14
	Meal mixture { Oats, 4 "	" 13	6½	4·8	·31	4½	4·8	·21	10	4·6	·46	7	5·5	·38	8½	4·5	·38	6	5·0	·30	42½	4·87	2·04
	Meal mixture { Oil meal, 2 "	" 14	6	4·2	·25	4½	4·6	·20	8½	4·9	·41	6½	5·4	·35	8	4·3	·34	5½	4·9	·26	39	4·71	1·81
	(Meal fed dry and all they would stand.)	" 15	6	4·1	·24	4½	4·4	·19	9	4·9	·44	6½	5·3	34	8	4·2	·33	5	5·0	·25	39	4·65	1·79
		" 16	6	4·0	·24	3½	4·8	·16	9½	4·8	·45	6½	5·3	·34	8	4·1	·32	5	5·0	·25	38½	4·66	1·76
		" 17	5	3·8	·19	3½	4·9	·17	9½	4·4	·41	6	5·2	·31	8	4·0	·32	5	5·0	·25	37	4·55	1·65
		" 18	5	3·9	·19	3½	4·8	·16	9½	4·5	·42	6½	5·1	·33	8	4·2	·33	5½	5·0	·27	38	4·58	1·70
		" 19	4½	3·9	·17	3	4·9	·14	9½	5·0	·47	7	4·8	·33	8	5·1	·40	5	4·8	·24	37	4·75	1·75
		" 20	4½	3·6	·15	3	4·9	·14	9	4·2	·37	7	4·8	·33	7½	4·2	·31	5	4·9	·24	36	4·43	1·54
	Total....................	....	87½	4·1	3·61	61	4·7	2·76	135	4·6	6·21	95	5·1	4·72	119	4·4	5·23	79	4·9	3·83	576½	4·57	26·36

Cows.	Rations Fed. 7 days Ensilage, Bran, Oats, Gluten, Pumpkins, Clover Hay.			14 days Ensilage, Clover Hay, Bran, Gluten } fed wet.			14 days Ensilage, Clover Hay, Barley, Oats, Oil Meal } fed dry.		
	Average Milk per day.	Average per cent fat.	Average dy. yield butter fat.	Average Milk per day.	Average per cent fat	Average dy. yield butter fat.	Average Milk per day.	Average per cent fat.	Average dy. yield butter fat.
	lbs.		lbs.	lbs.		lbs.	lbs.		lbs.
Bloom	17	4·0	·68	15½	4·0	·608	10½	4·3	·452
Della	18	4·5	·81	18	4·4	·790	16½	4·8	·792
Florence	17	4·2	·71	15	4·3	·640	14	4·6	·644
Julia	25½	3·4	·86	22½	3·4	·765	26½	3·5	·900
Begonia	23	3·5	·81	22	3·3	·726	24	3·6	·864
Bell	25½	3·8	·97	22	3·8	.836	25	3·9	·975
Total	126	3·84	4·84	114	3·83	4·365	116½	3·99	4·627

DAIRY HERD MILK RECORDS.

That our Canadian dairy cattle are, on the whole, not as profitable as they could be made is well known. That they might and should be the most profitable medium of converting our coarse grains and forage into merchantable produce has long been proven. It is evident, therefore, that as dairymen we should all bend our every energy to the improvement of this condition of affairs.

To preach the doctrine of good dairy bulls has long been the laudable practice of institute workers and agricultural writers. The selection of the best cows goes hand in hand with this, and to determine which animals really are paying all expenses and leaving a profit, a fairly accurate record of the milk produced must be kept.

During the past year an effort has been made to reach a number of our dairymen and get them interested in the keeping of such records. A large number agreed to keep records, and were furnished with blank forms.

Of the value of keeping such a record of the dairy cow, the following opinions are quoted from a few co-operators in various parts of the Dominion.

Uxbridge, Ont. :—'I have been doing the work for 4 years past, and if I did not consider it was an advantage I would not favour continuing the practice. It enables me to cull out the unprofitable cows.'—Jos. E. Gould.

Carlton West, Ont. :—'I would advise all farmers who keep cows to keep a record and learn just what each one is doing for him.'—Edward Adams.

Parry Harbour.—'I have learned a great deal, although for years I have kept a record of every one of my heifers for the first two years. I would advise every farmer to keep a record of what his cows are doing.'—James S. Miller.

Chute a Blondeau.—'By keeping a record of my cows, I have learned a great deal as to the value of the different feeds for milk. I would say to one and all : Keep a record of the cows if you want to find out where your profit comes from.'—D. D. Gray.

St. Emile Junction, Que.—'I most certainly do not regret the few moments employed in this work, which has made me familiar with the powers and qualities of my individual cows.'—C. Bonin.

Halfway Brook, N.S.—'I have learnt to watch the effect of feed on the cows, and thus feed more intelligently. I have obtained a good idea of the value of individual cows. It is well worth the trouble.'—Wm. Hunt.

Kentville, N.S.—'I think this is a good thing if carried out, and no doubt will be a boon to many a farmer throughout the country.'—C. O. Allen.

Bridgetown, N.S.—'It is a very simple and effective means of discovering and proving both the value and capacity of each individual cow, and also the effect of feed. My present feeling in regard to the record is that it is invaluable to any farmer who wishes to make his dairy herd a profitable branch of farming.'—A. Owen Price.

Leduc, N.W.T.—'I am grateful to you for advancing the plan of weighing the milk. I have decided to make it a rule to keep a record of my cows, and would advise all farmers to do likewise. I find it very little extra trouble.'—Robert Duncan.

Penhold, N.W.T.—'I have learnt enough to want to learn more. I know now much more about my cows, and am learning all the time.'—E. Carswell.

Upper Sumas, B.C.—'I believe that the testing of the herd of cows is well worth the labour and time it takes.'—Orion Bowman.

Many letters of a similarly gratifying character have been received, expressing appreciation of the work in helping the dairymen to detect the 'boarder' of the herd, as one man graphically puts it.

It is hoped to extend the list of co-operators and to make the effort at improvement in this line more general. To this end we shall be pleased to send blank forms with full particulars to farmers and dairymen wishing to undertake the work.

MILK TESTING.

During the year the following samples were tested in the dairy at the experimental farm :—

Skim milk	11
Butter-milk	9
Cream	12
Milk	21

The dairyman also tested at the milk factory, L'Ange Gardien, Que., 251 samples of milk and one sample of skim milk, the expenses in connection with this latter work being defrayed by the factory at L'Ange Gardien.

STEER FEEDING EXPERIMENTS.

The experiments with steers during the winter 1900-1 have been along the line of determining the comparative economy (1) of feeding dehorned steers, loose as contrasted with feeding steers not dehorned, tied ; (2) of feeding steers loose, a large number in a box, as contrasted with few in a box ; (3) of feeding steer calves, yearlings, two-year olds, or three-year olds ; (4) of feeding steer calves a limited or growing ration as contrasted with a heavy or fattening ration.

In estimating the cost of feeding steers and calves, the following prices were charged, being the current Ottawa market values of the different materials during the season 1900-01 :—

	Per ton.
Roots, 6 cents per bushel, or	$ 2.00
Ensilage	2.00
Clover hay	6.00
Straw	3.00
Corn	18.00
Oats, pease, or barley	19.00
Bran	15.00
Shorts	16.00
Oil meal	32.00
Gluten meal	16.00
Skim milk, 15 cents per cwt.	3.00
Calf meal, Blatchford's	90.00

During the last two years no experiments have been conducted to gain any further information as to the comparative value of different feeds for the production of beef. The aim in feeding has been to apply information already gained in this line, both here and elsewhere, and investigation has been confined, as indicated above, to the determination of the influence of age and manner of stabling in economy of beef production.

To eliminate as far as possible the influence of individual character in determining the results, groups of nine animals have been used in most cases.

The feeds fed have been mangels, turnips, carrots, ensilage, clover hay, and straw for roughage ; while corn, oats, barley, bran, gluten meal, and oil meal have made up the concentrated or meal ration.

When taken off grass, the steers are fed a roughage ration consisting of turnips, ensilage and clover hay. The feeds are fed in the proportion of, 30 roots, 15 ensilage, 5 hay. The hay is fed long, the roots pulped and mixed with ensilage. The amount fed is measured by the appetite of the animals, care being taken to keep them keen on their feed. As long as good daily gains in weight are secured this ration is continued. As soon as any appreciable lessening in daily rate of increase is observed, a small addition of meal is made to the roughage ration. This change or addition it is found must be made about 5 weeks after stabling. Steers started off in this way do not make phenomenal gains at any time, but are never likely to go 'off feed.' Neither are they likely ever to make gains enough in the day to pay for their keep, save during short intervals, but they are quite likely to keep near the paying point continuously, and thus leave a chance of a profit.

PROFITS IN STEERS.

To say there are great opportunities for making money by feeding steers would be misleading. To condemn the production of beef as a losing business in eastern Canada would be unwise. The farmer with much rough feed and a scarcity of labour will find in well-bred steers a good market for his produce, roughage and grain, at current prices. In addition, the rich manure so plentifully produced is an *invaluable* and *indispensable* and an *imperative* requirement of successful farming in Canada.

The personal factor enters so strongly into the possibility of a profit beyond this that it is impossible to predict the result. The careful buyer and good seller makes a profit where the less business-like man would incur a loss. The studious feeder finds what form of concentrate is the cheapest according to its properties, and uses it ; the careless man uses the handiest or what on the face looks cheapest, while it really may

be the dearest. Every little point requires careful consideration. The keen, broad, business man will make a profit, or at least get good value for his feed. The narrow, niggardly feeder will just as surely sell his feed cheap and work for low wages.

GENERAL STATEMENT.

During the year, steers were fed off to the value of $5,510.18. The cost, November 15th, 1900, was $3,485.40. The increase in value was $2,024.78. The feed cost, at prices quoted above, $1,611.76. The gross cost to produce the beef was, therefore, $5,097.16.

This leaves a net profit of $413.02. The manure quite easily pays for the labour of attending the stock and the wear and tear.

The number of steers fed was 94. Of these, 12 were bought as calves. The net profit per steer was $4.39. This is 5 cents per steer less than last year. Among the steers purchased, however, were 2 which were unthrifty, and after feeding them 2 months it was found necessary to sell them at less than cost.

DIFFERENT AGES.

The experiments with calves, yearlings, two-year olds, and three-year olds are rather interesting, as showing the great advantage of feeding growing animals as contrasted with mature or old animals. The yearlings and two-year olds put on flesh at practically the same cost, while the calves were much more economical as meat producers, and the three-year olds much less economical. The finished product varied in value as follows :—

Calves, $4.50 per 100 lbs. at 1 year old.
Yearlings, $4.77 per 100 lbs., at 2 years old.
Two-year olds, $5 per 100 lbs., at 3 years old.
Three-year olds, $5.12½ per 100 lbs., at 4 years old.

While the cost to put on flesh was as follows :—

Calves, $3.24 per 100 lbs. gain.
Yearlings, $5.77 per 100 lbs. gain.
Two-year olds, $5.71 per 100 lbs. gain.
Three-year olds, $6.37 per 100 lbs. gain.

From a glance at the above, it might be concluded that on all save the calves a loss was incurred. The fact of the case, however, as shown in the records below is that on all there was a profit.

The profit on each lot save the first alone is due to the increased value of the flesh bought. The cost of the various lots being as follows :—

Calves, cost $2.75 per 100 lbs.
Yearlings, cost $3.38 per 100 lbs.
Two-year olds, cost $3.50 per 100 lbs.
Three-year olds, cost $4.25 per 100 lbs.

This shows an increase in value of 100 pounds live weight of flesh purchased in each case as follows :—

Calves, increased value of 100 lbs. by $1.75.
Yearlings, increased value of 100 lbs. by $1.39.
Two-year olds, increased value of 100 lbs. by $1.50.
Three-year olds, increased value of 100 lbs. by 87½ cents.

The apparent break in the gradation of increase of value in live weight is due to the fact of the yearlings being rather small to make profitable shippers, and so having to rank as 'butcher's cattle.'

The average cost to feed one steer in each case was as follows :—

Calf, cost to feed 203 days		$13.80
Yearling	"	18.20
Two-year old	"	18.96
Three-year old	"	22.82

Below are full particulars of each lot in the experiment of feeding at different ages.

CALVES.

Number of steers in lot	5
First weight, gross	1,852 lbs.
First weight, average	370 "
Finished weight, gross	3,903 "
Finished weight, average	780 "
Total gain in 196 days	2,051 "
Average gain per steer	412 "
Daily gain for lot, 5 steers	10·46 "
Daily gain per steer	2·09 "
Gross cost of feed	$ 66.60
Cost of 100 lbs. gain	3.24
Cost of steers, 1,852 lbs. at $2.75 per cwt	50.93
Total cost of beef, $50.93+$66.60	117.53
Value of 3,903 lbs. at $4.50 per cwt.	175.63
Profit on lot	58.10
Net profit per steer	11.62
Average cost price per steer	10.19
Average selling price per steer	35.12
Average increase in value	24.93
Average cost of feed per steer	13.32

YEARLINGS.

Number of steers in lot	9
First weight, gross	7,845 lbs.
First weight, average	873 "
Finished weight, gross	10,680 "
Finished weight, average	1,187 "
Total gain in 203 days	2,835 "
Average gain per steer	315 "
Daily gain for lot, 9 steers	13·96 "
Daily gain per steer	1:55 "
Gross cost of feed	$163 77
Cost of 100 lbs. gain	5 77
Cost of steers, 7,845 lbs. at $3.38 per cwt.	265 00
Total cost to produce beef, $265+$163.77	428 77
Sold 10,147 lbs. at $4.77 per cwt.	483 12
Profit on lot	54 35
Net profit per steer	6 04
Average cost price per steer	29 44
Average selling price per steer	53 68
Average increase in value	24 24
Average cost of feed per steer	18 20

TWO-YEAR OLDS.

Number of steers in lot	9	
First weight, gross	8,730	lbs.
First weight, average	970	"
Finished weight, gross	11,720	"
Finished weight, average	1,302	"
Total gain in 203 days	2,990	"
Average gain per steer	332	"
Daily gain for lot, 9 steers	14·23	"
Daily gain per steer	1·58	"

Gross cost of feed	$170 70
Cost of 100 pounds gain	5 71
Cost of steers, 9 at $34	306 00
Total cost to produce beef, $306+$170.71	476 70
Sold 11,134 pounds at $5 per cwt.	556 70
Profit on lot	80 00
Net profit per steer	8 88
Average cost price per steer	34 00
Average selling price per steer	61 85
Average increase in value	27 85
Average cost of feed per steer	18 96

THREE-YEAR OLDS.

Number of steers in lot	9	
First weight, gross	10,950	lbs.
First weight, average	1,217	"
Finished weight, gross	14,175	"
Finished weight, average	1,575	"
Total gain in 203 days	3,225	"
Average gain per steer	358	"
Daily gain for lot, 9 steers	15·88	"
Daily gain per steer	1·76	"

Gross cost of feed	$205 41
Cost of 100 lbs. gain	6 37
Cost of steers, 10,403 lbs. at $4.25 per cwt.	437 13
Total cost to produce beef, $437.17+$205.41	642 58
Sold, 13,467 lbs. at $5.12½ per cwt.	690 21
Profit on lot	47 63
Net profit per steer	5 29
Average cost price per steer	48 57
Average selling price per steer	76 69
Average increase in value	28 12
Average cost of feed per steer	22 82

TIED VERSUS LOOSE.

As it is impossible to speak positively from one experiment along any given line, it was decided to continue the Tied *versus* Loose feeding test for several years.

In the record of the experiments conducted along this line last year, as shown in the report for 1900, page 75, the steers fed tied did better than those fed loose. This year the results show a margin in favour of the steers fed loose as contrasted with a similar lot fed tied. The steers in the various experiments were sold to go

June 3, 1901. Up till May the records of the two lots showed a margin in favour of the tied steers, but from that date till the shipping day, June 3, the loose steers kept gaining on the tied steers, till they stood, as indicated in the records which follow :—

Not Dehorned, Tied (3 years old.)

Number of steers in lot	9
First weight, gross	10,171 lbs.
First weight, average	1,130 "
Finished weight, gross	13,285 "
Finished weight, average	1,476 "
Total gain in 203 days	3,114 "
Average gain per steer	346 "
Daily gain for lot of 9 steers	15·34 "
Daily gain per steer	1·70 "
Gross cost of feed	$205 41
Cost of 100 pounds gain	6 60
Cost of steers, 9,663 pounds at $4.25 per cwt.	410 68
Total cost to produce beef, $410.68+$205.41	616 09
Sold, 12,621 pounds at $5.12½ per cwt.	646 20
Profit on lot	30 11
Net profit per steer	3 34
Average cost per steer	45 63
Average selling price per steer	71 80
Average increase in value	26 17
Average cost of feed per steer	22 82

Dehorned, Loose (3-year olds).

Number of steers in lot	9
First weight, gross	10,583 lbs.
First weight, average	1,175 "
Finished weight, gross	13,845 "
Finished weight, average	1,538 "
Total gain in 203 days	3,262 "
Average gain per steer	363 "
Daily gain of lot of 9 steers	16·07 "
Daily gain per steer	1·78 "
Gross cost of feed	$213 74
Cost of 100 pounds gain	6 55
Cost of steers, 10,054 pounds at $4.25 per cwt.	427 29
Total cost to produce beef, $427.29+$213.74	641 03
Sold, 13,153 pounds at $5.12½ per cwt.	674 09
Profit on lot	33 06
Net profit per steer	3 67
Average cost price per steer	47 47
Average selling price per steer	74 90
Average increase in value	27 43
Average cost of feed per steer	23 75

LARGE *versus* SMALL LOTS, LOOSE.

As indicated in last year's report, an experiment to gain some information as to the advisability of feeding few or many steers together, loose, has been tried. The data obtained from this experiment would indicate that 6 was the most suitable num-

ber to feed loose together, but a study of the individuals composing the different lots seemed to show that the character of the separate steers, as good or bad feeders, was an important factor in determining the final standing.

The fact of a steer being a 'good feeder,' or a 'bad feeder,' frequently affects very seriously the accuracy of the results. The buyer can in selecting feeders usually reject such as are likely to be 'bad doers,' or 'bad feeders.' It is, however, not always possible to single out the prospective, bad feeder, and rather poor doers are not always possible of detection. The difficulty is further increased when it comes to the question of selecting a large number of steers which shall make equal gains under similar treatment.

When a large number of animals is used in each lot, the individuality of the animals is in a measure overcome, and the larger the number, the less allowance is necessary for extra good or rather poor animals. Therefore, where differences in the number of animals fed together are the main feature of the experiment, it is quite evident that individual quality must be of more importance in the small lots than in the large.

Considering the above, the experiment may not be of any great value, but the subtended results are given for what they are worth :—

Dehorned, Loose (3-year olds.)

Number of steers in lot	9	
First weight, gross	10,583	lbs.
First weight, average	1,175	"
Finished weight, gross	13,845	"
Finished weight, average	1,538	"
Total gain in 203 days	3,262	"
Average gain per steer	363	"
Daily gain for lot of 9 steers	16·07	"
Daily average per steer	1·78	"
Gross cost of feed	$213 74	
Cost of 100 pounds gain	6 55	
Cost of steers, 10,054 lbs. at $4.25 per cwt.	427 29	
Total cost to produce beef, $427.29+$213.74	641 03	
Sold, 13,153 lbs. at $5.12½ per cwt.	674 09	
Profit on lot	33 06	
Net profit per steer	3 67	
Average cost price per steer	47 47	
Average selling price per steer	74 90	
Average increase in value	27 43	
Average cost of feed per steer	23 75	

Dehorned, Loose (3-year olds.)

Number of steers in lot	6	
First weight, gross	6,593	lbs.
First weight, average	1,099	"
Finished weight, gross	8,770	"
Finished weight, average	1,461	"
Total gain in 203 days	2,177	"
Average gain per steer	363	"
Daily gain for lot of 6 steers	10·72	"
Daily gain per steer	1:79	"

Dehorned, Loose (3-year olds)—Concluded.

Gross cost of feed	$136 09
Cost of 100 pounds gain	6 25
Cost of steers, 6,264 pounds at $4.25 per cwt.	266 22
Total cost to produce beef, $266.22+$136.09	402 31
Sold, 8,332 pounds at $5.12½ per cwt.	427 01
Profit on lot	24 70
Net profit per steer	4 11
Average cost price per steer	44 37
Average selling price per steer	71 16
Average increase in value	26 79
Average cost of feed per steer	22 68

Dehorned, Loose (3-year olds.)

Number of steers in lot	3
First weight, gross	3,430 lbs.
First weight, average	1,143 "
Finished weight, gross	4,470 "
Finished weight, average	1,490 "
Total gain in 203 days	1,040 "
Average gain per steer	346 "
Daily gain for lot of 3 steers	5·12 "
Daily gain per steer	1·70
Gross cost of feed	$ 70 30
Cost of 100 pounds gain	6 76
Cost of steers, 3,259 pounds at $4.25 per cwt.	138 51
Total cost to produce beef, $138.51+$70.30	208.81
Sold, 4,247 lbs. at $5.12½ per cwt.	217 66
Profit on lot	8 85
Net profit per steer	2 95
Average cost price per steer	46 17
Average selling price per steer	72 55
Average increase in value	26 38
Average cost of feed per steer	23 43

STEER CALF EXPERIMENTS.

The experiment started last year with 10 steer calves has been continued, and below is a detailed statement of the feed, gains, and cost for the year.

The experiment is being repeated, and 10 steer calves have again been selected and started out. The rations have not been exactly similar with those of 1900, but the variation is small.

No comment on, or close study of these experiments will be made till several series have been completed. The data submitted will speak for themselves.

The aim is to determine the comparative economy of feeding calves a full fattening ration from the start as contrasted with a limited growing ration.

May Calves, *1901*.

EXPERIMENT II, CALVES—FULL FATTENING RATION.

Week ending	Milk.	Oats.	Corn.	Oil Meal.	Calf Meal.	Bran.	Shorts.	Pease.	Roots.	Ensilage.	Straw.	Hay.
May 25	245	$17\frac{1}{2}$	$4\frac{6}{16}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	.....
June 1	350	$17\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	.....
" 8	350	$17\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	.....
" 15	350	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	$17\frac{1}{2}$
" 22	350	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	$17\frac{1}{2}$
" 29	350	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	$17\frac{1}{2}$
July 6	350	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$17\frac{1}{2}$	.....	.....	.....	.....	.....	$17\frac{1}{2}$
" 13	525	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$6\frac{9}{16}$	$17\frac{1}{2}$	$17\frac{1}{2}$	.....	.....	.....	.....	$17\frac{1}{2}$
	2,870	140	46	46	46	140	$17\frac{1}{2}$	.....	.....	.....	.....	88
July 20	525	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	.....	$17\frac{1}{2}$	$17\frac{1}{2}$	.....	.....	.....	.....	$17\frac{1}{2}$
" 27	525	$17\frac{1}{2}$	$6\frac{9}{16}$	$6\frac{9}{16}$	.....	$17\frac{1}{2}$	$17\frac{1}{2}$	.....	.....	.....	.....	$17\frac{1}{2}$
Aug. 3	525	$17\frac{1}{2}$	$17\frac{1}{2}$	$6\frac{9}{16}$	.....	$17\frac{1}{2}$	.....	.....	.....	35	.....	35
" 10	525	$17\frac{1}{2}$	$17\frac{1}{2}$	$6\frac{9}{16}$	.....	$17\frac{1}{2}$	.....	.....	.....	35	.....	35
" 17	525	$17\frac{1}{2}$	$17\frac{1}{2}$	$6\frac{9}{16}$	.....	$17\frac{1}{2}$	.....	.....	.....	35	.....	35
" 24	525	35	35	$17\frac{1}{2}$	.....	$17\frac{1}{2}$	.....	.....	.....	105	.....	35
" 31	525	35	35	$17\frac{1}{2}$	.....	$17\frac{1}{2}$	.....	.....	.....	105	.....	35
Sept. 7	525	35	35	$17\frac{1}{2}$	.....	$17\frac{1}{2}$	.....	.....	.....	105	.....	35
	4,200	192	171	85	.....	140	35	.....	.....	420	.....	245

EXPERIMENT II, CALVES—FULL FATTENING RATION.

Week ending	Milk.	Oats.	Corn.	Oil Meal.	Bran.	Ensilage.	Hay.	Roots.
September 14	525	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	105	35	.....
" 21	525	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	105	35	.....
" 28	525	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	105	35	.....
October 5	.....	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	140	35	.....
" 12	.....	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	175	35	.....
" 19	.....	35	35	$17\frac{1}{2}$	$17\frac{1}{2}$	175	35	.....
" 26	.....	35	35	$17\frac{1}{2}$	35	350	35	.....
November 2	.....	35	35	$17\frac{1}{2}$	35	525	35	.....
" 9	.....	35	$52\frac{1}{2}$	$17\frac{1}{2}$	35	700	35	175
" 16	.....	35	$52\frac{1}{2}$	$17\frac{1}{2}$	35	700	35	175
" 23	.....	35	$52\frac{1}{2}$	$17\frac{1}{2}$	35	875	35	175
" 30	.....	35	$52\frac{1}{2}$	$17\frac{1}{2}$	35	875	35	175
	1,575	420	490	210	315	4,830	420	700

EXPERIMENT II, CALVES—LIMITED GROWING RATION.

Week ending	Milk.	Oats.	Corn.	Oil Meal.	Barley.	Bran.	Shorts.	Pease.	Roots.	Ensilage.	Straw.	Hay.
May 25	175	17½	......	4⅜	......	17½	......	......	......	......	......	17½
June 1	175	17½	......	4⅜	......	17½	......	......	......	......	......	17½
" 8	175	17½	......	4⅜	......	17½	......	......	......	......	......	17½
" 15	245	17½	......	4⅜	......	17½	......	......	......	......	......	17½
" 22	350	17½	......	4⅜	......	17½	......	......	......	......	......	17½
" 29	350	17½	......	4⅜	......	17½	......	......	......	......	......	17½
July 6	525	17½	......	4⅜	......	17½	......	......	......	......	......	17½
" 13	525	17½	......	4⅜	......	17½	......	......	......	......	......	17½
	2,520	140	......	35	......	140	......	......	......	......	......	140
July 20	525	17½	......	4⅜	......	17½	17½	......	......	......	......	17½
" 27	525	17½	......	4⅜	......	17½	17½	......	......	......	......	17½
Aug. 3	525	17½	......	4⅜	......	17½	17½	......	......	35	......	35
" 10	525	17½	......	4⅜	......	17½	17½	......	......	35	......	35
" 17	525	17½	......	4⅜	......	17½	17½	......	......	35	......	35
" 24	525	17½	......	17½	......	35	35	......	......	105	......	35
" 31	525	17½	......	17½	......	35	35	......	......	105	......	35
Sept. 7	525	17½	......	17½	......	35	35	......	......	105	......	35
	4,200	140	......	74	......	192	192	......	......	420	......	245

Week ending	Milk.	Oats.	Barley.	Bran.	Shorts.	Ensilage.	Hay.	Roots.
September 14	525	17½	17½	35	35	105	35	....
" 21	525	17½	17½	35	35	105	35	....
" 28	525	17½	17½	35	35	105	35	....
October 5	....	17½	17½	35	35	175	35	....
" 12	....	17½	17½	35	35	175	35	....
" 19	....	17½	17½	35	35	350	35	....
" 26	....	17½	17½	35	35	525	35	....
November 2	....	17½	17½	35	....	700	35	....
" 9	....	17½	....	35	....	700	35	175
" 16	....	17½	....	35	....	875	35	175
" 23	....	17½	....	17½	....	875	70	350
" 30	....	17½	....	17½	....	875	70	350
	1,575	210	140	385	245	5,565	490	1,050

EXPERIMENT II., CALVES—SUMMARY—LOT II. FULL FATTENING RATION.

Period.	Total Gain of Lot.	Daily Rate of Gain per Steer.	Cost to Feed Lot.	Cost of 1 pound Gain.	Cost to Feed 1 Steer 1 day.	Weight at beginning of period.	Remarks.
	Lbs.	Lbs.	$ cts.	Cts.	Cts.	Lbs.	
1st of 8 weeks	582	2·08	9 60	1·65	3·43	468	May 29.
2nd of 8 weeks	515	1·84	13 32	2·58	4·94	1,050	
3rd of 12 weeks	650	1·55	22 78	3·50	5·42	1,565	
Average or aggregate	1,747	1·92	45 70	2·60	5·02	2,215	Final weight.

EXPERIMENT II., CALVES—SUMMARY—LOT I. LIMITED GROWING RATION.

Period.	Total Gain of Lot.	Daily Rate of Gain per Steer.	Cost to Feed Lot.	Cost of 1 pound Gain.	Cost to Feed 1 Steer 1 day.	Weight at beginning of period.	Remarks.
	Lbs.	Lbs.	$ cts.	Cts.	Cts.	Lbs.	
1st 8 weeks	530	1·89	7 14	1·35	2·55	475	
2nd 8 weeks	530	1·89	12 95	2·44	4·62	1,005	
3rd 12 weeks	491	1·17	18 61	3·79	4·43	1,535	
Average or aggregate	1,551	1·68	38 70	2·49	3·95	2,026	Final weight.

Calves, May, 1900.

EXPERIMENT I—LIMITED GROWING RATION.

Period Week ending	Oats.	Barley.	Bran.	Shorts.	Roots.	Ensilage.	Hay.	Straw.
December 8	35	17½	35	17½	175	140	35	....
" 15	35	17½	35	17½	315	280	35	....
" 22	35	17½	35	17½	350	315	35	....
" 29	35	....	17½	17½	490	455	35	....
January 5	17½	....	17½	17½	525	525	35	....
" 12	17½	....	17½	....	350	525	35	....
" 19	17½	....	....	....	875	525	35	....
" 26	....	....	....	....	700	700	35	35
	192½	52½	157½	87½	3,780	3,465	280	35

Period Week ending	Roots.	Ensilage.	Straw.	Hay.
February 2	875	700	35	35
" 9	700	700	35	35
" 16	700	700	35	35
" 23	875	875	35	35
March 2	875	875	35	35
" 9	875	875	35	35
" 16	525	1,225	35	35
" 23	525	1,225	35	35
	5,950	7,175	280	280

LIMITED GROWING RATION.

Period Week ending	Roots.	Ensilage.	Straw.	Hay.
March 30	525	1,225	35	35
April 6	525	1,225	35	35
" 13	....	1,400	35	35
" 20	....	1,400	35	35
" 27	350	1,225	35	35
May 4	350	1,225	35	35
" 8	150	525	35	35
	1,900	8,225	245	245

Period Week ending	Roots.	Ensilage.	Hay.	Pasture.
November 16	....	....	....	30 mos.
" 23	350	1,225	70	....
" 30	350	1,225	70	....
	700	2,450	140	30 mos.

EXPERIMENT I—FULL FATTENING RATION.

Week ending	Oats.	Corn.	Oil Meal.	Bran.	Gluten.	Roots.	Ensilage.	Hay.
Dec. 8	35	....	35	35	....	105	140	35
" 15	35	35	....	35	....	210	175	35
" 22	35	35	....	35	....	315	280	35
" 29	35	35	17½	35	....	455	420	35
1901.								
Jan. 5	35	35	17½	35	....	490	420	35
" 12	35	35	17½	35	....	490	455	35
" 19	35	35	17½	17½	....	700	630	35
" 26	35	35	17½	17½	....	700	630	35
	280	245	122½	245	....	3,465	3,150	280

FULL FATTENING RATION.

Week ending	Oats.	Corn.	Oil Meal.	Bran.	Gluten.	Roots.	Ensilage.	Straw.	Hay.
Feb. 2	52½	35	17½	17½	....	700	630	35	35
" 9	52½	35	17½	17½	....	700	630	35	35
" 16	52½	35	17½	17½	....	700	700	35	35
" 23	17½	....	17½	17½	35	700	875	35	35
Mar. 2	17½	....	17½	35	35	700	875	35	35
" 9	17½	....	17½	35	35	700	875	35	35
" 16	17½	....	17½	35	35	700	875	35	35
" 23	17½	....	17½	35	35	700	875	35	35
	245	105	140	210	175	3,500	6,335	280	280

FULL FATTENING RATION.

Week ending	Oats.	Gluten.	Oil Meal.	Bran.	Roots.	Ensilage.	Straw.	Hay.
March 31	17½	35	17½	35	700	875	35	35
April 6	17½	35	17½	35	700	875	35	35
" 3	35	35	17½	35	700	875	35	35
" 20	35	52½	17½	35	700	875	35	35
" 27	35	52½	35	35	525	1,050	35	35
May 4	35	52½	35	35	525	1,050	35	35
" 11	35	52½	35	35	525	1,050	35	35
" 18	35	52½	35	35	....	1,225	35	35
	245	367½	210	280	4,375	7,875	280	280

FULL FATTENING RATION.

Week ending	Oats.	Corn.	Oil Meal.	Bran.	Ensilage.	Straw.	Hay.	Green Feed.
May 25	35	70	35	35	1,225	35	35	
June 1	35	70	35	35	1,225	35	25	
" 8	35	70	35	35	1,225	....	70	
" 15	35	70	35	35	1,225	....	105	
" 22	35	70	35	35	1,225	....	105	
" 29	35	70	35	35	1,225	....	105	
July 6	35	70	35	35	1,225	....	35	Pasture.
" 13	35	70	35	35	1,225	....	35	Pasture.
	280	560	280	280	9,800	70	525	

FULL FATTENING RATION.

Week ending	Oats.	Corn.	Oil Meal.	Bran.	Ensilage.	Hay.	Green Feed.	Gluten.	Roots.
July 20	52½	70	35	35	1,050	35	Pasture at night on a small lot, 1 acre.		Pasture on one acre lot for six weeks.
" 27	52½	70	35	35	1,700	35			
August 3	52½	70	35	35	525	35			
" 10	52½	70	35	35	525	35			
" 17	52½	70	35	35	525	35			
" 24	70	105	35	35	525	35			
" 31	70	105	35	35	525	35			
September 7	70	105	35	35	525	35			
" 14	70	105	35	35	525	70			
" 21	70	105	35	35	525	70			
" 28	70	105	35	35	525	70			
October 5	70	105	35	35	525	70			
" 12	70	105	35	35	700	70			
" 19	70	....	35	35	700	70	....	122½	
" 26	70	....	52½	35	1,050	70	....	122½	
November 2	70	....	52½	35	1,050	70	....	122½	175
" 9	70	....	52½	35	1,050	70	....	122½	350
" 16	70	....	52½	35	1,225	70	....	122½	350
" 23	70	....	52½	35	1,225	70	....	122½	350
" 30	70	....	52½	35	1,225	70	....	122½	525
	1,202½	1,190	805	700	15,125	1,120	....	857½	1,750

EXPERIMENT I—SUMMARY FOR 1901—LOT I. LIMITED GROWING RATION.

Period.	Total Gain of Lot.	Daily Rate of Gain per Steer.	Cost to Feed Lot.	Cost of 1 pound Gain.	Cost to Feed 1 Steer 1 day.	Weight at beginning of Period.
	Lbs.	Lbs.	$ cts.	Cents.	Cents.	Lbs.
1st, 8 weeks	325	1·16	12 37	3·80	4·42	1,885
2nd, 8 "	295	1·05	14 38	4·87	5·14	2,210
3rd, 7 "	120	0·45	11 22	9·35	4·58	2,505
4th, 6 months	1,210	1·10	30 00	2·48	3·33	2,625
5th, 2 weeks	140	2·00	3 57	2·55	4·00	3,835
Statement for year	2,090	1·14	71 54	3·42	3·92	3,975*

* Weight, November 30, 1901.

EXPERIMENT I.—SUMMARY FOR 1901—LOT II. FULL FATTENING RATION.

Period.	Total Gain of Lot.	Daily Rate of Gain per Steer.	Cost to Feed Lot.	Cost of 1 pound Gain.	Cost to Feed 1 Steer 1 day.	Weight at beginning of Period.
	Lbs.	Lbs.	$ cts.	Cents.	Cents.	Lbs.
1st, 8 weeks	660	2·35	16 10	2·44	5·75	2,165
2nd, 8 "	609	2·17	19 40	3·14	6·92	2,825
3rd, 8 "	469	1·67	24 25	5·17	8·66	3,434
4th, 8 "	467	1·67	27 75	5·94	9·91	3,903
5th, 8 "	320	1·14	24 75	7·73	8·84	4,370
6th, 12 "	935	2·22	45 60	4·87	10·85	4,690
Statement for year	3,460	1·9	157 75	4·55	8·53	5,625*

*Weight November 30, 1901.

SHEEP.

The breeding flocks include the following animals of the Shropshire and Leicester breeds :—

Shropshires :—

1 ram (imp.), 18 months old.
1 ram lamb, 6 months old.
2 ewes (imp., 1899), 2½ years old.
2 ewes, 2½ years old.
5 ewes (imp., 1901), 1½ years old.
4 ewe lambs (imp., 1901), 8 months old.
3 ewe lambs, home bred, 6 months old.

Leicesters :—

1 ram lamb, 'Stanisson,' 8 months old.
1 ewe, 5½ years old.
3 ewes, 4½ years old.
2 ewes, 2½ years old.
2 ewes, 1½ years old.
2 ewe lambs, 6 months old.

Besides the above, there are three grades which are being experimented upon for breeding purposes.

The lamb crop the past spring was not so good as that for 1900, but the lambs have done much better during the past summer, and a number of good animals have been sold or retained for breeding purposes.

Several of the best Shropshire flocks in Great Britain were visited during the summer. At Mr. Minton's annual ram sale one of the top shearling rams was secured.

From the famous flock of Mr. Mansell were secured 5 shearling ewes and 4 ewe lambs. These, it is hoped, may constitute the foundation of a good flock.

The Leicester ram, Stanisson, was secured from Mr. A. W. Smith, Maple Lodge, Ont. He was a winner at the Pan-American Exposition, Buffalo, this year.

As in preceding years, the sheep were pastured on a small, stony field. This was supplemented by rape and some clover.

RAPE FOR SHEEP.

The use of rape as a pasture for sheep and lambs cannot be too highly commended. There are, however, two or three dangers to be guarded against. In the first place, care must be taken that the sheep do not enter the rape when very hungry, especially is there danger in this when the leaves are for any reason wet. The effect to be feared is 'bloating.'

Rape is, as indicated in the report for 1900, very rich in protein, much richer than most other forage plants, as the proportion of protein to carbo-hydrates is about 1 to 1:8. This is much too great a proportion of protein, and where sheep, or more particularly, lambs are confined to this feed they soon show signs of some injurious influence at work. A sleepiness is first observed, which later is followed by a weakness of the limbs and the sudden falling of the animal. It is, then, very difficult indeed to put them in good condition again. Of course, it is easy to avoid this trouble by letting the lambs have another pasture part of the day. For such a purpose a hill pasture or some pasture carrying but little clover is to be preferred.

SWINE.

There are on the farm at present four herds of pure-bred swine. They are made up as follows :—

Berkshires :—

1 boar (imp., 1901), 8 months old.
1 boar, 'Bobby,' 6 months old.
1 sow (imp., 1901), 1 year old.
2 sows, 1½ years old.

Large Improved Yorkshires :—

1 boar, 1½ years old.
5 sows, 1½ to 3 years old.
1 sow (imp., 1901), 1 year old.
1 sow, 9 months old.

Tamworths :—

1 boar, 'Hero,' 15 months old.
2 sows, 2 years old.
1 sow (imp., 1901), 1 year old.

Large Blacks :—

2 boars (imp., 1901), 6 months old.
2 sows (imp., 1901), 6 months old.

The imported pigs were secured from the most famous herds in England. The Yorkshire sow came from Sanders Spencer, Esq., St. Ives, Hunts ; the Berkshires, from Philo L. Mills, Esq., Ruddington Manor, Notts ; the Tamworth, from D. W. Phillips, Esq., The Ashes, Whiteacre, Birmingham.

The large Blacks seem to be slowly coming into prominence in England. The individuals are of the bacon type, but rather coarse. Some experimental work will be done with them here to test their value as an addition to our bacon breeds. An effort will be made to determine their value for crossing with some of the other breeds of pigs.

The breeding pigs during the past year have done only fairly well. The spring litters were rather late, which, of course, influenced the date of the fall litters.

During the season about 40 pigs have been sold for breeding purposes, and the rest of the young pigs sold for pork.

PORK PRODUCTION.

A large number of pigs have been fed during the year, but particular reports can be given of 4 lots only.

In each case the meal mixture fed consisted of one-half corn, the other half oats, pease and barley, equal parts. In addition, each pig was given 3 lbs. of milk daily and all the roots they would consume, as follows :—

Lot 1.—Turnips fed pulped.

Lot 2.—Mangels fed pulped.

Lot 3.—Sugar beets grown for forage fed pulped.

Lot 4.—Sugar beets grown for sugar production fed pulped.

Lot 1.—Meal, Milk, Turnips.

Number of pigs in test	4
Aggregate weight, January 7	405 lbs.
Average weight January 7	101 "
Aggregate weight April 23	768 "
Average weight April 23	192 "
Aggregate gain	363 "
Average gain	91 "
Daily rate of gain per pig for 106 days	·85 "

Pigs ate 780 lbs. meal at 90 cents per cwt.	$ 7 02
" 3,808 lbs. mangels at 10 cents per cwt.	3 81
" 1,284 lbs. skim milk at 20 cents per cwt.	2 57
Total	$13 40

Cost to produce pork was :—

405 lbs. feeders at $7 per cwt.	$28 35
Food consumed	13 40
Total cost	$41 75

Sold 768 lbs. pork at $6 per cwt.	$46 08
Profit on lot of 4 pigs	4 33
Cost to produce 100 lbs. increase live weight	3 69

Buyer's report :—

4 pigs, all 'select.'

Packer's report on carcasses :—

No. 312 weighed alive 197 lbs. ; dressed, 133 lbs. ; graded, 'good, firm.'
No. 313 weighed alive 197 lbs. ; dressed, 135 lbs. ; graded, 'hard, firm.'
No. 314 weighed alive 189 lbs. ; dressed, 126 lbs. ; graded, 'hard, firm.'
No. 315 weighed alive 185 lbs. ; dressed, 121 lbs. ; graded, 'good, firm.'

Lot 2.—Meal, Milk, Mangels.

Number of pigs in test	4
Aggregate weight January 7	377 lbs.
Average weight January 7	94 "
Aggregate weight April 23	766 "
Average weight April 23	191 "
Aggregate gain	389 "
Average gain	97 "
Daily rate of gain per pig, 106 days	·90 "

Pigs ate 786 lbs. meal at 90 cents per cwt.	$ 7 07
" 5,930 lbs. mangels at 10 cents per cwt.	5 93
" 1,284 lbs. skim milk at 20 cents per cwt.	2 07
Total	$15 57

Cost to produce pork was :—

377 lbs. feeders at $7 per cwt.	$26 39
Food consumed	15 57
Total cost	$41 96
Sold 766 lbs. pork at $6 per cwt.	$45 96
Profit on lot of 4 pigs	4 00
Cost to produce 100 lbs. increase live weight	4 00

Buyer's report :—

4 pigs, all 'select.'

Packer's report on carcasses :—

No. 319 weighed alive 195 lbs. ; dressed, 135 lbs. ; graded, 'good, firm.'
No. 317 weighed alive 195 lbs. ; dressed, 138 lbs. ; graded, 'good, firm.'
No. 318 weighed alive 182 lbs. ; dressed, 125 lbs. ; graded, 'good, firm.'
No. 319 weighed alive 194 lbs. ; dressed, 131 lbs. ; graded, 'good, firm.'

Lot 3.—Meal, Milk, Forage Sugar Beets.

Number of pigs in test	4
Aggregate weight January 7	307 lbs.
Average weight January 7	77 "
Aggregate weight April 23	807 "
Average weight April 23	202 "
Aggregate gain	500 "
Average gain	125 "
Daily rate of gain per pig, 106 days	1·18 "

Pigs ate 793 lbs. meal at 90 cents per cwt.	$ 7 13
" 4,298 lbs. sugar beets at 15 cents per cwt.	6 44
" 1,284 lbs. skim milk at 7 cents per cwt.	2 57
Total	$16 14

Cost to produce pork was :—

307 lbs. feeders at $7 per cwt.	$21 49
Food consumed	16 14
Total cost	$37 63
Sold 807 lbs. pork at $6 per cwt.	$48 42
Profit on lot of 4 pigs	10 79
Cost to produce 100 lbs. increase live weight	3 22

Buyer's report :—

3 pigs 'select,' 1 pig 'fat.'

Packer's report on carcasses :—

No. 320 weighed alive 175 lbs. ; dressed, 118 lbs. ; graded, 'medium, a little too thin.'
No. 321 weighed alive 218 lbs. ; dressed, 155 lbs. ; graded, 'very good, a little too fat.'
No. 322 weighed alive 187 lbs. ; dressed, 130 lbs. ; graded 'very fair.'
No. 323 weighed alive 227 lbs. ; dressed, 157 lbs. ; graded, 'very firm, right thickness of fat.'

Lot 4.—Meal, Milk, Sugar Beets (Special Culture.)

Number of pigs in test	4
Aggregate weight January 7	228 lbs.
Average weight January 7	57 "
Aggregate weight May 25	754 "
Average weight May 25	188 "
Aggregate gain	528 "
Average gain	132 "
Daily rate of gain per pig for 138 days	·95 "
Pigs ate 1,032 lbs. meal at 90 cents per cwt.	$ 9 29
" 4,266 lbs. sugar beets at 15 cents per cwt.	6 39
" 1,680 lbs. skim milk at 20 cents per cwt.	3 36
Total	$19 04
Cost to produce pork was :—	
228 lbs. feeders at $7 per cwt.	15 96
Food consumed	19 04
Total cost	$35 00
Sold 754 lbs. pork at $6 per cwt.	$45 24
Profit on lot of 4 pigs	10 24
Cost to produce 100 lbs. increase live weight	3 60

Buyer's report :—

4 pigs, all 'select.'

No packer's report on carcasses.

During the past three years a large number of pigs have been fed in this department to determine, if possible, the influences affecting that quality of pork commonly known as 'firmness.'

THE SOFT PORK PROBLEM.

The series of experiments were planned by Mr. F. T. Shutt, the chemist, and myself, and each carcase examined for firmness by one or both of us. For several reasons it could not, on the whole, be made an experiment in comparative economy of feeding for the various rations. A number of lots have been reported on in this respect, however, in the reports for 1899-1900, as well as in this year's report.

To give some idea of the scope of the experimental feeding carried on, I may say that the following influences were studied in their effect upon the quality of the finished product :—

1. Eastern or Ottawa district pigs as contrasted with western or St. Clair district pigs when fed similarly.

2. Pigs, outside in roomy lots, as contrasted with pigs in cramped quarters, under cover, fed similar rations.

3. Preparation of feed, as feeding similar lots similar feed, dry, soaked, or cooked, ground in each case.

4. Supply of feed, a limited, as contrasted with an unlimited supply of similar feed fed in a similar manner.

5. Feeding one kind of feed from beginning to end of experiment, as contrasted with feeding similar feed during first period, or up to 100 pounds live weight, then changing to a different feed, and the reverse of this.

6. Different feeds, oats, pease, barley, Indian corn, shorts, beans, skim milk, rape, clover pasture, steamed clover, mangels, turnips, sugar beets, pumpkins, artichokes.

These were fed separately or in mixtures of different proportions prepared as indicated above.

To neglect individual and group results (a full report of which may be found in Bulletin No. 38), I may say that the experiments seem to point to the following conclusions :—

1. Locality whence pigs come has apparently no influence on firmness.

2. Opportunity of exercise as afforded by a large run does not appear to materially affect firmness.

3. Neither cooked nor soaked feed has any superiority over dry feed as a producer of firm bacon.

4. Feeding a large rather than a limited or small ration is not likely to affect firmness.

5. Kind of feed determines the kind of bacon, health being good.

(*a*) Indian corn produces soft pork, unless fed in small quantities or with skim milk (or whey).

(*b*) The greater the proportion of Indian corn in the ration, the softer is the pork likely to be.

(*c*) Oats, pease and barley in equal parts make up an excellent ration for the production of firm pork.

(*d*) Skim milk is without a peer as part of any ration for the production of firm pork.

(*e*) Rape, pumpkins, artichokes, sugar beets, turnips, and mangels may be expected to have no injurious effects upon the firmness of the pork product when fed with an otherwise good ration.

6. General good health and thrift are important for the production of firm bacon. Skim milk added to any grain or succulent ration will add to the thrift of the animals. A fairly roomy yard, pen or run is conducive to good health and thrift.

SOIL CULTIVATION.

That our arable soils have undergone a great change since the first settlers stirred their fertile depths, I am sure the most conservative will admit ; that the change has been for the better only too few have any ground for asserting ; on the contrary, almost every farmer whose memory goes back twenty, or even ten years will agree that our crops to-day in any of the eastern provinces are not, as a rule, what they used to be, and the question naturally comes, why this falling off in returns, even from the fields of many of our best farmers ? It may be answered that the causes are various. Yet they seem to be included in the lack of one marked peculiarity of fertile lands—good physical condition. No matter how rich the area in the essentials of plant life, though every foot of the land be saturated with phosphates and potash and nitrates, yet, being in poor physical condition, the returns are sure to be low.

A bare definition of physical condition will indicate but imperfectly the reasons for the results claimed.

Physical condition may be said to mean the degree of friability or openness or crumbliness of a soil, its power to retain moisture, and its immediate water-content.

To show the importance attached to good physical condition by one of the most famous of agriculturists, let me quote from the works of the late Sir John Lawes, chief of the celebrated Rothamstead experiment station, who, after an experience of over 50 years in soil cultivation and fertilization, said : 'All our experiments tend to show that it is the physical condition, its capacity for absorbing and retaining water, its permeability to roots, and its capacity for absorbing and retaining heat that is of more importance than its chemical composition.'

Conditions of Plant Growth.—To discuss 'good physical conditions, it is necessary to consider for a few moments the requirements of the healthy, growing plant. They are : Light, air, moisture, heat and food. The lack of any one, or the superabundance of any one, means death to the plant. Their presence in too small or too large proportions means sickly plants.

Light, we cannot control, therefore it need not be discussed.

Air will, of course, always surround the stems and leaves of our crops, but it is just as necessary to the roots. Water-soaked, baked, or puddled soils do not permit any air to circulate among their particles. They are, therefore, not suited for plant occupation. It is to lack of air in such cases rather than superabundance of water or impermeability of the soil to roots that failure is due.

Moisture, or water is necessary as a solvent for much of the plant's food. It serves as a vehicle for carrying the food from the soil to the leaves of the plant. An abundance is absolutely indispensable, an over-supply is fatally injurious.

The heat necessary for seed germination and plant growth is a relative condition, and so dependent upon the other factors for its effectiveness as to need but little discussion at this point. That high temperatures with abundant moisture induce rank growth is well known to every farmer. To secure such a combination in our northern latitudes requires careful cultivation. It really depends on good physical condition.

Food is, of course, an important requirement in plant growth. Acting on the assumption that food is the all in all, the one great factor in plant life, many have followed this premise to its logical conclusion and supplied the plant with food in specially prepared forms in more or less homeopathic (relatively speaking) doses. Most soils contain immense quantities of plant food. It is not always in an available form. Adding to this supply in practically the same form will not guarantee good results. The following of a course likely to secure good physical conditions would insure an abundant supply of plant food in the form best suited for sustaining plant life by converting the erstwhile unavailable food into available forms.

Influences Affecting Physical Condition of Soils.

The influences affecting physical condition are various, and it cannot be hoped to discuss them at any length at the present moment. To name the more important conditions, without reference to their relative importance, they might be said to be :—

1. The character of the soil ; that is, whether a clay, a clayey loam, sandy loam, sand, gravel, muck or peaty and, generally speaking, whether of a drift or an alluvial formation.

2. The water-line or water-level of the area.

3. The condition of the soil at time of cultivation ; that is, whether wet or dry when last ploughed or cultivated.

4. The crop that has been grown the previous year.

5. The amount of humus in the soil and the character of the same.

Character of the Soil.—The character of the soil is, generally speaking, the factor most likely to affect the physical condition of a field where no special attention has been paid to improvement of this imperative condition of fertility. The more the farmer studies the influences affecting physical condition and attempts in the right way to improve the same, however, the less will he find to be the necessity for considering the kind of soil making up his fields.

In the case of well drained alluvial soils he can hardly make a miss did he try. Other soils, however, require more careful treatment, especially is this the case where the extremes, as they might be called—a heavy clay or a light sand—are to be considered. The intermediate soils demand less careful treatment and are very seldom injured by time or manner of cultivation.

The Water-line.—While once the water-level is 6 or 8 inches below the surface, it is quite possible to cultivate the fields, yet if success would be assured some way must be found to make the water-line at least 2 feet below the average soil surface level. Frequently, good crops may be grown where the water stands higher than this, but under average conditions it will be found profitable to so drain as to insure a root bed of at least twenty-four inches in depth. Roots will not penetrate below the water-line to any appreciable extent. The water-line is, therefore, the lower boundary of any farm or field. By how much lower this line, by so much more farm land for the owner may be said of it. True, the area of arable land is not changed, but the hunting ground of the root is extended, and this is, generally speaking, accompanied by a more vigorous, rank and rapid plant growth, there being, of course, so much more room for root development.

The condition of the soil at time of cultivation enters so materially into the success or failure of the whole year's operation that it is justly considered by many farmers the chief point, making for a good or bad crop. The heavy soil that shows a shining surface, glistening with moisture behind the plough, cannot be expected to give good returns from the next crop. The particles becoming compacted form into more or less large clods and all fertility contained in them is locked in the lump, not for one year merely, but for an indefinite period. The harm done by the simple operation cannot be undone save by years of patient, skilful toil.

As the gradation of soil goes towards the lighter or sandy forms less and less care need be given to its condition at time of cultivation, since there is less danger of the particles compacting.

The Previous Crop.—As a factor in the physical condition of a field at a given time, the previous crop on that field is usually of great importance. The turning down of a heavy sod makes a great difference in the physical condition of a field and in no kind of soil is the good effect more evident than heavy clay. The turning down of stubble is also beneficial, but not to the same extent.

The influence of fallow or partial fallow, as after corn, roots or potatoes, is also beneficial. The manure usually applied with such crops in addition to the cultivation puts the soil in a loose friable condition and a part of the plant food previously unavailable may after such crops be taken up by the plant.

Humus.—As an influence on the physical condition of a soil, humus is without a peer. As a factor in the improving of our soils it cannot be over-estimated. Its influence goes to render friable the heavy clay and to relieve it from the tendency to bake or harden. It has an opposite effect on light or sandy soils, the particles of which it causes to adhere and so make a firm root bed, the condition so often lacking in such soil, yet so essential to good results. The effect of humus on the water-content is to increase the amount of water possible of being held by a given volume of soil without doing injury to the plant root life therein. For this reason all dry soils are very greatly improved by humus, and for the same reason the humus should be retained

near the surface of the soil since that is the part most likely to suffer from evaporation.

In addition, while increasing the water holding power of a soil it increases the heat absorbing power and so promotes growth in that way ; heat and moisture, as stated above, making the best combination for rapid growth.

The continued cropping of our farm lands without an adequate return of farm-yard manure or the sufficient use of clover has resulted in the poor condition of many farms. The addition of humus to such so-called fertility depleted areas soon insures good crops and an apparent return of all the virgin richness.

Humus is decayed vegetable matter.—Farm-yard manure, clover roots, and green crops ploughed under are its most fruitful sources. Its place is near the surface. It can be kept there by surface cultivation.

ESTIMATING COST OF PRODUCTION.

The importance of determining cost of production of our grain and forage crops is scarcely questionable. The climatic, and soil factors must, however, always be of primary importance, and on that account all estimates must be more or less particular in their bearing rather than general.

In the estimates which are included in the following reports on the different crops, rent, manure, labour, material (seed, twine, &c.), and wear and tear are considered. The item of supervision, of considerable moment on such farms as this, has been omitted, since most farmers in Canada do much of their own work, as well as direct the labour of such men as they employ.

The digestibility of a feed is another factor which must enter materially into any consideration of its economy of production, since, as is well known, the digestibility of our feeding stuffs ranges from about 25 per cent of the dry matter to practically 100 per cent of the whole thing.

In dividing the cost of production of a grain crop between the straw and grain, however, where the digestible dry matter of the one part is so different in composition and value from that of the other, some additional standard is necessary. Since protein is that part of any ration the most expensive to supply, it was decided to make the digestible protein the basis of value. It is, of course, well understood that protein is not the only important constituent of straw. Frequently it is of very minor consideration indeed, as when used for litter, since about 29-30 of the whole dry matter is of equal or even greater value as absorbent material.

CROP ON THE 200 ACRE FARM

OATS.

Seven varieties of oats were grown ; they were Banner, Siberian, Tartar King. Waverly, Goldfinder, Scotch Potato and Improved Ligowo. They were sown on land that had been in roots or corn the preceding year. As the land was not of uniform character, the results will not indicate the comparative productivity of the different varieties.

The particulars of the lots sown are as follows :

Banner.—16 acres, sown May 4, 2 bushels per acre ; matured in 94 days, August 6. Yielded 45 bushels 2 pounds per acre. Measured bushel weighed 35 pounds.

Siberian.—8 acres, sown May 2, 1¾ bushels per acre ; matured in 91 days, August 1. Yielded 45 bushels 2 pounds per acre. Measured bushel weighed 31 pounds.

Waverly.—2 acres, sown May 1, 1¾ bushels per acre ; matured in 97 days, August 5. Yielded 47 bushels 8 pounds per acre. Measured bushels weighed 35¾ pounds.

Tartar King.—2 acres, sown May 1, 2 bushels per acre ; matured in 93 days, August 1. Yielded 47 bushels 1 pound per acre. Measured bushel weighed 36½ pounds.

Scotch Potato.—1 acre, sown May 1, 1¾ bushels per acre ; matured in 111 days, August 9. Yielded 44 bushels 19 pounds per acre. Measured bushel weighed 36 pounds.

Goldfinder.—1 acre, sown May 1, 2 bushels per acre ; matured in 111 days, August 9. Yielded 51 bushels 16 pounds per acre. Measured bushel weighed 34½ pounds.

Improved Ligowo.—5 acres, sown May 4, 1¾ bushels per acre ; matured in 88 days, July 31. Yielded 47 bushels per acre. Measured bushel weighed 37½ pounds.

Cost of growing 35 acres of oats—

Rent of land, at $3 per acre	$105 00
Cultivating and ribbing in autumn, 7½ days at $2.50	18 75
Cultivating and harrowing, 12 days at $2.50	30 00
⅓ manure, at the rate of 15 tons per acre, applied in root year, valued at $1 per ton	105 00
Seed, 66 bushels at 50 cents	33 00
Sowing, 3½ days at $2.50	8 75
Rolling, 2 days at $2.50	5 00
Cutting with binder, 3½ days at $2.50	8 75
Use of machinery	4 00
Twine	14 00
Shocking, 7 days at $1.25	8 75
Loading and unloading, 18 days at $1.25	22 50
Teams drawing, 6 days at $2.50	15 00
Threshing, 1,612 bushels at 2½ cents per bushel	40 30
	$418 80

Total yield, 54,815 pounds, or 1,612 bushels 7 pounds.

Average yield per acre, 1,566 pounds, or 46 bushels 2 pounds.

Total straw on 35 acres, 30 tons.

Cost to produce 1 bushel grain	22·7 cts.
Cost to produce 1 ton grain	$13 37
Cost to produce 1 ton straw	1 74
Cost to produce 100 pounds digestible dry matter, grain	107·3 cts.
Cost to produce 100 pounds digestible dry matter, straw	19·8 cts.

BARLEY.

Mensury.—5 acres were sown on what had been turnip land the preceding year. Sown May 4 ; matured in 79 days, July 22. Yielded 36 bushels 33 pounds per acre. Measured bushel weighed 48 pounds.

Cost of growing 5 acres of barley—

Rent of land, 5 acres at \$3 per acre	\$15 00
Ribbing in autumn, 1 day at \$2.50	2 50
Cultivating in spring, twice, 1 4-10 days at \$2.50	3 50
Harrowing, 3-10 day at \$2.50	0 75
Manure, ⅕, at the rate of 15 tons per acre, at \$1 per ton	15 00
Seed, 8¾ bushels at 50 cents	4 37½
Sowing, ½ day at \$2.50 per day	1 25
Rolling, 3 hours at \$2.50 per day	0 75
Cutting with binder, ½ day	1 25
Twine used, \$2 ; use of machinery, \$2	4 00
Shocking, 8-10 day at \$1.25	1 00
Hauling, team 1 day, \$2.50 ; men, 2 at \$1.25	5 00
Threshing, 184 bushels at 3½ cents per bushel	6 44
	\$60 81½

Total yield, 183 bushels, 21 pounds, or 8,784 pounds.

Average yield per acre, 36 bushels 33 pounds, or 1,757 pounds.

Total straw on 5 acres, 4 tons.

Cost to produce 1 bushel grain	33·1 cts.
Cost to produce 1 ton grain	\$13 84
Cost to produce 1 ton straw	1 70
Cost to produce 100 lbs. digestible dry matter, grain	90·3 cts.
Cost to produce 100 lbs. digestible dry matter, straw	18·7 cts.

PEASE.

Blue Prussian.—5 acres. This crop was grown on land that had been pastured the previous year. It had been broken up early the preceding autumn. The seeding was done May 7, and the crop matured in 95 days, August 10. Intense heat dried this crop up before ripening, lessening the yield per acre considerably. The yield was 19 bushels per acre. Measured bushel weighed 63 pounds.

Cost of growing 5 acres of pease—

Rent of land, at \$3 per acre	\$15 00
⅕ manure, 15 tons to the acre, at \$1 per ton	15 00
Ploughing shallow in autumn, at \$1.50 per acre	7 50
Cultivating twice in autumn 1½ days	3 75
Ribbing in autumn, 1 day, \$2.50	2 50
Cultivating in spring twice 1 5-10 days at \$2.50	3 75
Seed, 10 bushels at 80 cents	8 00
Sowing, ½ day, team	1 25
Cutting, team 1 day at \$2.50, men assisting, 2 at \$1.25	5 00
Threshing, at 2½ cents per bushel, 95 bushels	2 37
	\$64 12

Yield, 5,698 pounds, or 95 bushels grain.

Average yield per acre, 1,139 pounds, or 19 bushels.

Total straw on 5 acres, 4 tons 1,000 pounds.

Cost to produce 1 ton grain	$17 33
Cost to produce 1 bushel grain.	52
Cost to produce 1 ton straw.	3 27
Cost to produce 100 lbs. digestible dry matter, grain. . . .	110·7 cts.
Cost to produce 100 lbs. digestible dry matter, straw. . . .	43 cts.

MIXED CROP EXPERIMENTS.

Side by side on the first year of the rotation field, that is, on what had been pasture the preceding year, were sown 8 plots of 2 acres each, the aim being to get some data as to the comparative yields of crops grown as mixtures and as pure grains. The yields were materially affected by the bad season. The rank growth of the early part of the season made those mixtures containing pease rather more susceptible to injury from heat than were other mixtures or pure grains. The mixtures and pure grains are as follows :—

	Pounds.
Plot 1, pure pease, Blue Prussian, yielded	2,279
Plot 2, pure barley, Canadian Thorpe, yielded	2,140
Plot 3, pure oats, Banner, yielded	3,637
Plot 4, pease and oats, equal parts by measure	2,022
Plot 5, pease, 1 bushel, oats, 2 bushels, yielded	1,492
Plot 6, oats 1½ bushels, barley 1 bushel, yielded	2,477
Plot 7, wheat ½ bushel, barley ¾ bushel, oats 1 bushel, pease, ¾ bushel, yielded	1,775
Plot 8, pease and oats, equal parts by weight, yielded	2,114

HAY.

As in previous years, the hay crop follows the grain, which comes immediately after roots and corn. At the same time as the grain is sown a heavy seeding of timothy and clover is made. Clover is sown at the rate of 6 pounds red clover and 2 pounds of Alsike per acre, mixed with 12 pounds of timothy seed. Where surface cultivation is practised, and the surface soil for that reason particularly rich in humus, there is very little danger of a miss or failure.

The first cutting of hay is principally clover, the aftermath contains usually a good sprinkling of timothy, and the next crop in the succeeding spring will be chiefly timothy with a slight admixture of Alsike. Two years under hay or hay and pasture is quite sufficient, if it is intended to maintain or increase the fertility of the soil or if it is desired to get the very best returns from the land.

The importance and advisability of giving a good heavy seeding and leaving only a short time down, was well exemplified here this year. Twenty-two dairy cows were pastured on 16 acres and in July it was deemed advisable to cut the grass on the pasture, as it was evident the cattle would not be able to use it to advantage. From the 16 acres were cut 11 tons 1,355 pounds of cured hay.

BROME GRASS FOR PASTURE.

A rather noticeable area in the above 16 acres was a stretch of 4 acres in extent, which had been seeded to brome grass when the rest of the field had been seeded to clover and timothy. The growth was very thick and strong, but the cattle seemed

to prefer it to the other herbage and ate it close to the ground, leaving the timothy and clover on the adjoining land to make such a growth as is indicated above.

Hay was an excellent crop here this year, and leaves a large margin of profit.

Cost of growing clover hay—

Rent of land, at $3 on 37 acres	$111 00
½ manure, at the rate of 15 tons per acre at $1 per ton	111 00
½ seed, at $1.50 per acre, 10 lbs. clover, 12 lbs. timothy	46 25
5 days cutting with mower, at $2.50 per day	12 50
3½ days raking, at $1.75 per day	6 13
3½ days tedder, at $1.75 per day	6 12
Rent of farm machinery, oil, &c.	4 50
Cocking, loading, and unloading, 28 days at $1.25	35 00
7 days drawing to barn, at $2.50	17 50
	$350 00

Yield, 3 tons 484 pounds per acre

Total yield, 119 tons 1,908 pounds.

Average amount digestible dry matter in 1 ton, 1,100 pounds.

Cost to produce 1 ton of hay in barn	$ 2 92
Cost to produce 100 lbs. digestible dry matter	26·54
Cost to produce 1 acre of hay	9 48
Cost to produce 1 ton digestible dry matter, labour alone considered	1·17

The second crop on 20 acres of the above was very heavy. It was chiefly clover, but included a small admixture of timothy. It made very cheap hay, as indicated below. The yield was 1 ton 95 lbs. per acre.

Clover, second crop, season of 1901—

20 acres reported above gave a yield of 1 ton and 95 pounds.

Cutting with mower, 2½ days at $2.50	$ 6 25
Raking, 2 days at $1.75 per day	3 50
Cocking, loading and unloading, 10 men at $1.25	12 50
Drawing, teams, 2 at $2.50	5 00
Rent of farm machinery	2 50
	$29 75

Total yield, 20 tons 1,900 pounds.

Cost to produce 1 ton hay in barn	$ 1 42

CLOVER ENSILAGE.

As noted in report for 1900, a small silo was built that year for experimental purposes. This silo was filled for the first time, with second growth or aftermath, principally clover. The grass and clover was mown August 31, 1900, early in the morning and hauled to the silo while still wet with dew. It was thrown into the silo uncut and tramped as firm as possible. The mass of green forage cured into excellent ensilage and was eagerly eaten by the cattle, but was not relished by sheep. There was considerable waste on top and around the sides (probably 10 per cent of the whole amount that it was found possible to place in the silo).

The silo is a round one, built of staves on the plan outlined in Bulletin No. 35. It is 9 feet in diameter by 22 feet in height. Such a silo should hold, when well filled, about 30 tons of corn ensilage. By most careful filling on 3 separate dates we were able to include only 16 tons of the wet forage.

The material as put into the silo contained about 470 lbs. dry matter per ton. Such dry matter is about 70 per cent digestible. Since at least 10 per cent was wasted, there remained only 14·4 tons material. This amount of ensilage would contain 4,318 lbs. digestible dry matter.

The forage came off 3 acres. Below is a statement of the cost of the material in the silo. Naturally, only half the annual rental and manure expenditure are included.

Cost of 3 acres clover aftermath in silo—

Rent of land, half amount, 3 acres	$ 4 50
Manure, ⅓ at 15 tons per acre, $1 per ton, half amount . .	4 50
Seed, ¼ at $1.50	37½
Mowing, 4 hours at 25 cents per hour	1 00
Raking, 3 hours at 17½ cents	52½
Drawing, 1½ days at $2.50 per day	3 75
Men, loading and unloading, 6 at $1.25 per day	7 50
	$22 15

Total forage cured, 14⅗ tons.

Total amount digestible dry matter, 4,318 lbs.

Cost to produce 1 ton ensilage in silo	$ 1 54
Cost to produce 100 lbs. digestible dry matter	51·3

On June 6, 1901, this silo was filled again with practically pure clover. This time, however, the forage was cut into inch lengths. Owing to the material being cut into short lengths, we were able to include 33 tons 660 lbs. in the silo. This, it will be observed, is double the amount included when the forage was put in as mown.

The cut forage cured with very little waste into excellent ensilage, which was eaten with eagerness by dairy cattle as supplementary feed to pasture in August and September. To give some idea of the cost of producing such feed, when first cutting of clover is used rather than the last cutting, the subjoined itemized statement is included. The area from which the clover was removed, served later as a pasture for pigs and sheep ; therefore, only half the cost of rent and manure are charged.

Cost of growing clover ensilage (4 acres)—

Rent of land, half amount, 4 acres	$ 6 00
Manure, ⅓ at 15 tons per acre (half amount)	6 00
Seed, ¼ at $1.50 per acre	37½
Mowing, 5 hours at 25 cents per hour	1 25
Raking, ½ day at $1.75 per day	87½
Drawing, 2 days at $2.50	5 00
Men loading, working at blower and in silo, 10 at $1.25 per day	12 50
	$32 00

Forage produced, 33 tons 660 pounds.

Average dry matter per ton, about 360 lbs. (70 per cent digestible.)

Cost to produce 1 ton ensilage in silo.	96·2 cts.
Cost to produce 100 lbs. digestible dry matter.	38·2 cts.

CORN (ZEA MAYS).

Four varieties of corn were sown in areas ranging from 2 to 20 acres, the aggregate being 30 acres.

They were sown on land that had been under various grain crops the preceding year, and clover had been sown with all, excepting the pure pease. The soil was gang ploughed in late autumn, a good growth of clover being turned down. Manure at the rate of about 15 tons to the acre was hauled out in the winter, left in small heaps and scattered as the frost was leaving the ground. The soil was ploughed about 4 inches deep, harrowed, and then sown with a force seed drill in rows 42 inches apart. It was impossible to get all the corn into the silos. Particulars of the varieties are as follows :—

Leaming.—20 acres, sown May 27, cut for ensilage September 18 to 26. Yield, 16 tons 1,286 pounds per acre. Growth very strong and even, well cobbed, beginning to ripen. This plot suffered by very severe frost, lessening weight per acre.

Mammoth Cuban.—3½ acres, sown May 27, cut for ensilage September 27. Yield, 17 tons 90 pounds per acre. Growth very strong and even, well cobbed, beginning to ripen. This plot suffered by severe frost.

Mammoth Cuban.—1½ acres, sown May 27, cut and shocked September 28.

Longfellow.—2 acres, sown May 30, cut and shocked September 28. Strong, even growth, corn ripe, well cobbed.

King of the Earliest.—2 acres, sown May 30, cut and shocked September 30. Strong, even growth, cobs short, not as good as any of the other sorts.

Cost of growing 20 acres of Leaming—

Rent of land, at $3 per acre	$ 60 00
Gang ploughed in autumn, 6 8-10 days at $2.50	17 00
½ value of manure at 15 tons per acre at $1 per ton	60 00
Ploughing in spring, at $2 per acre	40 00
Harrowing twice, 2 4-10 days, at $2.50 per day	6 00
Seed, 35 lbs. per acre, 500 lbs. at $1 per cwt.	5 00
Sowing, team, 2½ days at $2.50 per day	6 25
Harrowing after sowing, twice, 2 4-10 days at $2.50 per day	6 00
Hoeing, 46 days at $1.25 per day	56 50
Cultivating, 15 days at $2.50 per day	37 50
Cutting with corn harvester, 6 days at $2.50	15 00
Loading, unloading, tramping and putting into silo, 69 days at $1.25	86 25
Drawing with team, 18½ days at $2.50	46 25
Use of engine, fuel, ensilage cutter and engineer for 5 days at $6.50	32 50
	$474 25

Yielded 332 tons 1,720 pounds corn.

Cost 1 ton in silo	$ 1 42⅓
Cost 1 bushel in silo.	04.27 cts.
Average amount digestible dry matter per ton (75 per cent digestible)	370 lbs.
Cost to produce 100 lbs. digestible dry matter.	38·47 cts.
Cost to produce 1 acre corn	$23 71

MANGELS.

Three varieties of mangels were grown on 6 acres of land. The seed was sown May 14, and harvesting operations began October 18. The varieties were as follows :

Gate Post Red.—2 acres, yielded 20 tons 5 lbs. per acre, or 40 tons 10 lbs., equal to 1,333½ bushels on the 2 acres.

Giant Yellow Globe.—2 acres, yielded 19 tons 1,040 lbs. per acre, or 39 tons 80 lbs., equal to 1,318 bushels on the 2 acres.

Golden Tankard.—2 acres, yielded 22 tons 1,030 lbs. per acre, or 45 tons 60 lbs., equal to 1,501 bushels on the 2 acres.

The dry matter content of the varieties differs slightly. They are as follows :—

Variety.	Digestible Dry Matter in 100 lbs. Roots.	From 1 Acre, lbs. of Digestible Dry Matter.
Gate Post Red	9·29	3,716·46
Giant Yellow Globe	9·10	3,552·64
Golden Tankard	9·63	4,336·39

Cost of growing 6 acres mangels—

Rent of land, at $3	$18 00
Gang ploughing in autumn, 2 4-10 days at $2.50	6 00
⅓ cost of manuring at 15 tons per acre, at $1 per ton	18 00
Ploughing in spring at $2 per acre	12 00
Harrowing, 4 hours at 25 cents	1 00
Drilling, 2½ days at $2.50 per day	6 25
Rolling, 4 hours at 25 cents	1 00
Seed, 24 lbs. at 20 cents	4 80
Sowing, 2 4-10 days at $1.25	3 00
Thinning, 12 days at $1.25 per day	15 00
Hand-wheel hoeing, 7 days at $1.25	8 75
Hoeing, 14 days at $1.25	17 50
Cultivating, single horse, 8 days at $1.75 per day	14 00
Pulling, topping, loading and unloading, 24 days at $1.25	30 00
Drawing team, 6 days at $2.50 per day	15 00
	$170 30

Total yield, 123 tons 1,560 lbs., average, 20 tons 1,260 lbs., or 687⅔ bushels per acre.

Cost to produce 1 ton mangels housed	$ 1 37½
Cost to produce 1 bushel mangels housed	4·12
Average dry matter per ton	187·5 lbs.
Cost to produce 100 lbs. digestible dry matter	73·3
Cost to produce 1 acre mangels	$28 38

TURNIPS.

Two varieties were grown, sown June 8, harvested November 4 ; manure was applied during the winter and spring at the rate of about 15 tons per acre.

Champion Purple Top Swede.—1 acre, yielded 18 tons 520 lbs., or 608⅔ bushels per acre.

Prize Purple Top Swede.—1 acre, yielded 17 tons 1,450 lbs., or 590⅚ bushels per acre.

Cost—

Rent of land, at $3 per acre	$ 6 00
Gang ploughing, 8-10 days at $2.50	2 00
⅕ manure, 15 tons per acre, valued at $1 per acre	6 00
Ploughing in spring, at $2 per acre	4 00
Harrowing, 2-10 days at 25 cents per hour	0 50
Drilling, 8-10 days at 25 cents per hour	2 00
Rolling, 1 hour at 25 cents	0 25
Seed, 6 lbs. at 20 cents	1 20
Sowing, 8 hours at $1.25 per day	1 00
Hand-wheel hoeing, 1 6-10 days at $1.25	2 00
Thinning, 4 days at $1.25	5 00
Hoeing, once, 2½ days at $1.25	3 13
Cultivating, single horse, 2 days, at $1.75 per day	3 50
Pulling, topping, loading and unloading, 9 men at $1.25	11 25
Drawing, 2 days at $2.50	5 00
	$52 83

Total yield from 2 acres, 35 tons 1,970 lbs.

Cost to produce 1 ton turnips housed	$ 1 47
Cost to produce 1 bushel turnips housed	4·41
Average digestible dry matter in 1 ton	209·8 lbs.
Cost to produce 100 lbs. digestible dry matter	$ 0 70
Cost to produce 1 acre of turnips	26 42

HARVESTING TURNIPS.

Much is heard as to the best methods of harvesting turnips, and in order to get some definite information as to the comparative economy of some of the more common plans, a record was kept of the time occupied in harvesting each of 3 equal plots.

Plot 1.—Size, ¾ of an acre. The manual labour required to harvest this plot was equal to 1 man for 24 hours. The turnips were pulled by hand, and the roots and tops removed by a large knife in the hands of the operator.

Plot 2.—Size, ¾ of an acre. The manual labour required to harvest this plot was equal to 1 man for 26 hours 40 minutes. The turnips were topped by means of hoes while still firm in the earth. They were then bottomed, or the roots removed, with the same implements. The topping and bottoming took much less time when done this way than when each turnip passed through the hands of the operator, but much more time was required to load the turnips.

Plot 3.—Size, ¾ of an acre. The manual labour required to harvest this plot was equal to 1 man for 24 hours 5 minutes, besides horse labour of 1 horse for 5 hours. The turnips were topped by means of hoes while still firm in the earth. They were then bottomed, or the roots removed, by means of a single horse cultivator with

all but the 'L' teeth removed. These were set so close as to necessitate the cutting of everything that passed between the standards. As in plot 2, much more time was required to load roots topped and bottomed this way than when handled as in plot 1.

CARROTS.

On account of trouble in keping red carrots in good condition for any length of time, it was decided to abandon for a while the use of this root as a field crop. The method of growing the white carrots was quite similar to that described in previous reports and the variety grown was the Improved Short White. The seed was sown May 15. The carrots made a good rapid growth and were harvested October 21. The yield was 26 tons 1,080 lbs., or 884⅔ bushels from 1 acre.

Cost of growing one acre—

Rent of land	$ 3 00
Gang ploughing in autumn, 4-10 days at $2.50	1 00
½ manure, 15 tons per acre, $1 per ton	3 00
Ploughing in spring, ⅘ days at $2.50	2 00
Harrowing, 1½ hours at 25 cents	37½
Drilling, 3½ hours at 25 cents	87½
Rolling, ¾ hour at 25 cents	18¾
Seed, 3 lbs. at 45 cents	1 35
Sowing, 4 hours at 12½ cents per hour	0 50
Hand-wheel hoeing, twice, 1½ days at $1.25	1 87½
Thinning, 3½ days at $1.25 per day	4 37½
Hoeing once, 1¼ days at $1.25 per day	1 56¼
Cultivating, single horse, 1 3-10 days at $1.75 per day	2 27½
Ploughing out carrots, team, 3½ hours, at $2.50 per day	0 87½
Pulling, topping, loading and unloading, 8 days at $1.25	10 00
Drawing, 1½ day at $2.50	3 75
	$37 00

Grown on one acre, 26 tons 1,080 lbs.

Cost to grow 1 ton carrots housed	$ 1 39
Cost to grow 1 bushel carrots housed	4·18
Average dry matter per ton	200 lbs.
Cost of 100 lbs. digestible dry matter	69½ cts.

SUGAR BEETS.

Two plots of sugar beets were grown, Danish Improved was the variety selected.

To gain some information as to the comparative economy of growing sugar beets or mangels for feed, and to ascertain the relative cost of growing a given area (1) as for forage, (2) as for sugar, two plots of one-half acre each were grown side by side. The ground was prepared as for other root crops, and the same amount of barn-yard manure was applied. In thinning for forage, plants were left 8 inches apart ; but for sugar, 6 inches apart. The hoeing, cultivating, &c., was the same for some time, but when a fair growth had been made, that is, when the plants were about two months old, those intended for forage were treated as mangels, *i.e.*, the upper part of the root left exposed, while those intended for sugar were hilled up, the whole root and crown thereof being covered.

Yield per acre was at the rate of 17 tons 840 lbs. from the forage, and 16 tons 600 lbs. from the sugar plot, or 560⅔ bushels and 543⅓ bushels, respectively

The digestible dry matter content of the roots from the two plots differed materially, namely, 19.50 lbs. of dry matter in 100 lbs. of roots in the case of roots cultivated for sugar, and 18·54 lbs. of dry matter in 100 lbs. of roots intended for forage. Below is the cost of producing sugar beets, (*a*) for sugar, (*b*) for forage :—

(*a*) *Beets* (*for Sugar*).

Cost of growing one-half acre sugar beets, for sugar—

Rent of land, at $3 per acre	$ 1 50
Gang ploughing in autumn, 2 hours at 25 cents	0 50
½ manure, at 15 tons per acre, valued at $1 per ton	1 50
Ploughing in spring, at $2 per acre	1 00
Harrowing in spring	0 20
Drilling in spring	0 37½
Rolling in spring	0 08
Seed, 6 lbs. at 20 cents per lb.	1 20
Sowing, 2 hours, at $1.25 per day	0 25
Hand-wheel hoeing, 3 hours at $1.25 per day	0 37½
Thinning, 2 2-10 at $1.25 per day	2 75
Hoeing twice, 12 hours	1 50
Cultivating, single horse, 4 times at $1.75 per day, two hours each	1 40
Ploughing out roots, 2 hours at 25 cents	0 50
Pulling and topping, 2 days at $1.25 per day	2 50
Drawing in roots, 6½ hours at $2.50 per day	1 62½
Loading and unloading, 17 hours at 12½ cents	2 12
	$19 37½

Yield on one-half acre, 16,300 lbs.

Cost to produce 1 ton	$ 2 38
Cost to produce 1 bushel	7:14
Digestible dry matter in 1 ton	390 lbs.
Cost of 100 lbs. digestible dry matter	61 cts.
Cost to grow 1 acre sugar beets	$38 75

(*b*) *Sugar Beet* (*for Feed*).

Cost of growing one-half acre sugar beets, for feed—

Rent of land, at $3	$ 1 50
Gang ploughing in autumn, 2 hours at 25 cents	0 50
½ manured at 15 tons per acre, valued at $1 per ton	1 50
Ploughing in spring at $2 per acre	1 00
Harrowing in spring	0 20
Drilling in spring	0 37½
Rolling in spring	0 08
Seed, 6 lbs. at 20 cents per lb.	1 20
Sowing, 2 hours, at $1.25 per day	0 25
Hand-wheel hoeing, 3 hours at $1.25 per day	0 37½
Thinning, 1 8-10 days at $1.25 per day	2 25
Hoeing, one day at $1.25	1 25
Cultivating, single horse, 4 times, 2 hours each, at $1.75	1 40
Ploughing out roots, 2 hours at 25 cents	0 50
Pulling and topping, 18 hours at $1.25 per day	2 25
Drawing in roots, 6 hours at $2.50 per day	1 50
Loading and unloading, 14 hours at $1.25 per day	1 75
Yield on one-half acre, 17,420 lbs.	$17 88

Cost to produce 1 ton	$ 2 05
Cost to produce 1 bushel	6·15
Digestible dry matter in 1 ton	371 lbs.
Cost of 100 lbs. digestible dry matter	55 cts.
Cost to grow 1 acre for forage	$35 76

RAPE.

This forage plant has come rather slowly to the front in Ontario, and is practically unknown in the other provinces of the Dominion. As the production of pork, mutton and beef increases, however, it is certain to come more into common use. As a feed for young stock of any description it is unequalled. As a supplementary ration for pigs and lambs it is unrivalled. As a partial ration for 'feeders' when first stabled in autumn it is unexcelled.

The greatest returns from a given area are secured by using as a soiling crop. Excellent results are obtained by pasturing. When sown early and cut for feed it will grow up again. When pastured off not too closely, a growth of nourishing succulent forage is constantly available.

It may be grown with a cover crop or independently. When sown with barley or oats, good results may frequently be anticipated. Under such conditions, however, it is very much more influenced by the vagaries of the weather. When sown alone it may be put in broadcast or in rows. When the soil is strong and the season somewhat advanced, it is occasionally advisable to sow broadcast. Generally speaking, it should be sown in rows from 21 to 30 inches apart. Where the rows are close together, a somewhat greater portion of the plant goes to stalk rather than leaves which are the most nutritious. In rows 30 inches apart there is ample room for full leaf development ; besides, it is much easier to cultivate and keep in a vigorous growing condition.

Rape is a greedy feeder and will do well on the richest land. We have never seen land too strong for it. It is not particular as to the kind of soil in which it shall grow, but is imperative in its demands for large supplies of food. A soil rich in humus is much to its liking.

The plant is quite as rich in protein or flesh forming material as are the legumes. It adds nothing to the soil, however, but is on the contrary rather exhaustive. Where fed off on the field it improves the condition of the land. Rape may not be cured for winter use. If cut late in the autumn, however, and left in small piles to freeze, it may be brought in later, and after being perfectly thawed out may be fed to steers or other cattle.

The preparation of the soil is important. A well rotted sod should be chosen. It should be thoroughly cultivated to a fair depth, say, 6 inches. The seed should then be sown on the flat, unless in very wet soil, when it is preferable to ridge. The seed is sown at about the same rate per acre as turnip seed. The land must be cultivated between the rows for some weeks. The plants should not be thinned in the rows. Under fair conditions the crop may be pastured about the eighth week. It may be cut for soiling about the tenth week.

The seeds of several varieties are on the market. A test of some of these was made this year. Three varieties were sown under similar conditions on similar soil at the rate of three pounds per acre. The results were as follows :—

Plot 1.—¼ acre, sown May 20, in drills 30 inches apart.

Lot 1. *Dwarf Victoria.*—Growth weak, drying out, not desirable.

Lot 2. *Dwarf Essex.*—Growth strong, best of first set.

Lot 3. *Broad Leaved.*—Growth fairly strong, not as broad leaved as Lot 2.

The plot appeared to have been sown too early or should have been fed earlier.

Plot 2.—¼ acre, sown June 1 in drills 30 inches apart.

Lot 1. *Dwarf Victoria.*—Growth fairly strong, better than Plot 1, Lot 1.

Lot 2. *Dwarf Essex.*—Growth strong, even, good colour.

Lot 3. *Broad Leaved.*—Growth medium, not equal to Lot 2.

Plot 3.—¼ acre, sown June 15, in drills 30 inches apart.

Lot 1. *Dwarf Victoria.*—Growth fairly strong, about the same as Lot 2.

Lot 2. *Dwarf Essex.*—Growth about equal to Lot 1, not quite as many wilted leaves.

Lot 3. *Broad Leaved.*—Growth medium, even, not equal to Dwarf Essex.

Plot 4.—¼ acre, sown July 15, in drills 30 inches apart.

Lot 1. *Dwarf Victoria.*—Growth fairly strong, best lot of sort.

Lot 2. *Dwarf Essex.*—Growth strong, even, good colour, best lot in the plot.

Lot 3. *Broad Leaved.*—Growth medium, not equal to Dwarf Essex.

Of the three vericties sown, Dwarf Victoria, Dwarf Essex and Broad Leaved, the Dwarf Essex is apparently the best suited for this section of the country. Under no condition tested was any variety superior to the Dwarf Essex, while in some cases the Dwarf Essex was much superior to the other two sorts. The Dwarf Victoria and Broad Leaved sorts seem to be nearly equal in value for forage, with possibly a slight advantage in favour of the Broad Leaved.

To give some idea of the cost of production, the following statement has been compiled. As most of the rape this year was fed off as pasture the cost of producing a ton of this forage can not be stated.

Cost of growing two acres of rape—

Rent of land, at $3	$ 6 00
Ploughing in autumn, at $2 per acre	4 00
Cultivating twice in spring, 7 hours at 25 cents	1 75
Harrowing, twice, 3 hours at 25 cents	0 75
Rolling, 1¼ hour	0 31
Seed, 6 pounds at 10 cents	0 60
Sowing, 4 hours at $1.25 per day	0 50
Hand-wheel hoeing, once, 8 hours at $1.25	1 00
Cultivating, 3 times, single horse, 1½ days at $1.75 per day	2 62
Hoeing twice, 4 days at $1.25 per day	5 00
	$22 53

The yield per acre ranges from 6 to 30 tons of green feed. The field of rape, the cost of growing, which appears above, was part of an old pasture. It received no manure, but gave a fair stand of forage, probably 15 tons per acre. A similar field heavily manured in 1900 gave over 30 tons per acre.

PUMPKINS.

Half an acre was planted on June 8. The soil was a sandy loam, and well drained. Manure was first applied at the usual rate of 15 tons per acre, worked into the soil. The plot was then thoroughly cultivated and harrowed. It was marked off into 8-foot squares, and a small hole, about 18 inches square and 6 inches deep, excavated at each corner. These holes were half filled with manure, a layer of earth

thrown on top and seed planted. The plants grew well and in a short time covered the whole area. A large quantity of fruit developed and grew to a fair size, the yield from the half acre being 22,470 pounds, or 1,558 pumpkins, averaging 14 1-7 pounds in weight.

These were fed to dairy cattle and swine. The dairy cattle did well on this feed, and it was found difficult to maintain an equal flow of milk after the supply was exhausted.

Swine also did well on them. Dry brood sows were in some cases fed no other food, and maintained their weight.

Cost of production of pumpkins—

Rent, half an acre at $3 per acre	$ 1 50
Gang ploughing in autumn, 2 hours at 25 cents	0 50
Manure, one-fifth applied at rate of 15 tons per acre	1 50
Extra manure in hills, 6 tons, used ½ the value	3 00
Ploughing in spring	1 00
Harrowing twice	0 18
Marking, making hills, and planting 1½ days at $1.25 . .	1 87½
Hoeing, 1 day at $1.25	1 25
Cultivating, single horse, 3 hours, at $1.75 per day	0 52
Hauling, team, 1 day, $2.50, extra man, $1.25	3 75
	$15 07½

Weight produced, 22,470 pounds.

Cost to produce 1 ton . . . . $ 1 34

One ton contains about 190 lbs. digestible dry matter.

Cost of producing 100 lbs. digestible dry matter 0 70

REPORT OF THE POULTRY MANAGER.

(A. G. GILBERT.)

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the pleasure of transmitting herewith the fourteenth annual report of the poultry department. The subjects treated are in connection with the experimental work of the year, and are given under their different headings. The most important are as follows:—

1. Results of continued investigation and observation into the cause of so many weak germs in eggs laid by hens in early spring time, before they have had a run outside.
2. What experience has shown to be the best methods for farmers to adopt in the early raising of chickens.
3. The experiences of correspondents in their attempts at early hatching.
4. The want of a simple and inexpensive means of detecting the winter-laying hens from the non-productive ones. Where the present means of doing so are faulty.
5. Foods, their composition and effect. The farm rations and how made up. The rations fed by two farmers.
6. The proper care and feeding of the chickens. Their weight development.
7. New breeds on trial and their characteristics.
8. How the early moulting of the laying stock was brought about. And other detailed information in connection with the experimental work since last report.

Addresses were delivered during the year in different parts of the Dominion on the 'proper breeds of poultry for farmers' and 'the care, feeding and management of fowls so as to make them profitable.' At the Whitby and Renfrew fairs object lessons in the proper methods of killing, plucking and dressing poultry and the management of incubators and brooders were instructive and interesting features. Dressed poultry, consisting of turkeys, geese and chickens were exhibited at the Provincial Fat Stock Show at Guelph, and at the Maritime Winter Fair at Amherst, N.S., and were instructive as showing the farmers how poultry should be prepared for sale for the home markets.

I have pleasure in again mentioning the faithful services of Mr. George Deavey, who assists in the care and feeding of the poultry, &c.

The demand for reports and instruction as to poultry keeping and the breeds best suited for winter layers and rapid flesh makers from all parts of the country, has increased to a remarkable extent, and with an increased correspondence are instances of the rapid development that the poultry department of the farm is making.

I have the honour to be, sir,
Your obedient servant,

A. G. GILBERT.

CENTRAL EXPERIMENTAL FARM,
OTTAWA, November 30, 1901.

REPORT OF THE WORK OF THE PAST YEAR, 1901.

The experiments and observation in connection with the procuring of eggs in winter to be sold for eating purposes, or their conversion by means of artificial incubation into chickens, technically known as broilers, were continued last season. Much attention has, in recent years, been directed to the latter part of the work. In the report of my department for 1900 (last year), results were given of the attempts made during the previous winter season to ascertain the cause or causes of the weak germs in so many of the fertilized eggs laid by hens and pullets during that period, and which resulted in a large percentage of the embryos dying, in the course of incubation, notably at the 'pipping' stage. This large percentage of loss is a serious drawback to the successful prosecution of an enterprise that offers a large margin of profit. It was shown by last season's operations that it was easier to get the fertilized egg than the strong germ so necessary for the hatching of the robust chicken. This is an important point to remember, and in reference to it a leading poultry paper remarks: 'Is a distinction that is hardly ever given any thought. If the eggs are fertile that is as far as we have gone.' The results as given in report of last year attracted widespread attention, and the hope was expressed that investigation would be continued until a satisfactory solution of the difficulties is discovered, if such be possible.

WHAT PAST EXPERIENCE HAS MADE EVIDENT.

The experience so far gained in connection with this important work shows that there is room for much study and experiment. The close observer cannot fail to realize how many are the factors to be considered, how finely adjusted must the balance be, in the treatment of his stock, so as to have them profitably productive during the winter months, when it is so much against their natural instinct to be so. In fact so great have the drawbacks in connection with the artificial hatching and rearing of chickens, during that season been found by many persons, that they unhesitatingly state their belief that more money is to be made out of the sale of winter eggs at the city prices of 35 and 40 cents per dozen than by their conversion into broilers, worth later on $1.25 to $1.50 per pair. However open this statement may be to challenge there can be no denial of the ever increasing demand for both winter eggs and early broilers. The high price offered for the latter is doubtless the incentive to their production. The numerous letters received from farmers and ambitious beginners asking for information on the subject is proof of this. In such cases the advice given in report of last year still holds good. It is to the effect that with the facilities usually at his command the farmer or beginner should be content with the production of winter eggs and late April or May chickens rather than to attempt the raising of broilers which requires expert knowledge and a special plant. The large poultry purchasing companies established in different parts of the provinces in recent years, and which are the outcome of the rapid development of the poultry interests of the country, call loudly for a well grown, plump July or August roaster. This demand should easily be filled by farmers who have the rapid flesh-making Plymouth Rocks, Wyandottes or Buff Orpingtons. That it affords a profitable margin of profit is beyond question. Doubtless there are farmers who are engaged in broiler raising, but their number is few and they are possessed of all the requisites to success in knowledge, facilities and near-by city market. The situation from the farmers standpoint is well described in the following note from the wife of a widely known farmer :—

'ENGLESIDE FARM,
'BROCKVILLE, Oct. 22, 1901.

'The Manager
'Poultry Department, Experimental Farm,
'Ottawa.

'DEAR SIR,—In reply to your question as to which pays best, from a farmer's standpoint, sale of new laid eggs in winter at 35 to 40 cents per dozen, or their con-

version into broilers to sell at $1.25 to $1.50 per pair. I think it best to sell the eggs at city prices. Unless a farmer had all the necessary plant and number of hens he could not make broiler raising pay.

'MRS. W. J. N.'

SOME OBSERVATIONS CONFIRMED.

The observations of last winter were confirmatory of those of the previous season. If they pointed to one of the suspected causes more strongly than another it was to the effect of the extremely artificial conditions under which the laying stock existed. It again seemed evident that until the hens had a run outside, and so had opportunity to recuperate from this long term of artificial life that a satisfactory percentage of strong germs could not be had. And the term of artificial life last season was unusually long, the hens going into winter quarters in mid-November and so remaining until the disappearance of the snow in the following spring. A secondary course, perhaps, may be traced to the composition of the rations, quantity and frequency with which they were fed. The composition and manner of feeding the rations is shown in another page.

It was remarked in report of last year that variety in the composition of and method of feeding the rations was beneficial, at all times, but indispensable in the month of March, if egg eating and feather picking were to be avoided. The observations of last spring emphasized this in no uncertain manner. This experience coming after an unusually long term of winter confinement makes it all the more striking.

Indeed, the observations of many years go to show that a regular supply of pure water, green food, grit, &c., are imperative, where success is the object.

THE WORK OF LAST WINTER AND RESULTS.

The work of last winter may briefly be described as follows:—Soon after going into winter quarters the hens were mated up, when possible, with two-year old male birds. At the end of December the eggs were saved for hatching. At that time the hens had been laying fairly well for a month. On the 6th of January an hundred egg incubator was filled, and throughout the winter months more eggs were placed in other incubators, which were as carefully attended to as circumstances would permit. The conditions under which the incubators were operated were perhaps a little harder, owing to the more severe and protracted season, but results were little different from those of the previous year and were most discouraging.

December and January eggs showed on examination a much larger percentage of dead germs in different stages of development than unfertile or clear eggs. Numerous fully developed chicks dead in shell, many at pipping stage. In some cases they were nearly 50 per cent of the tested eggs. This clearly pointed to weak germs. Some idea of the unsatisfactory results may be had from the following instance. On the 5th of February 180 eggs laid during the previous month of January by Plymouth Rock, Wyandotte, Langshan, Indian Game and White, Buff and Brown Leghorn hens were placed in an incubator. These eggs were hatched on the 26th of February, and resulted in 26 chickens. Six of the number were cripples and were killed. In this case after deducting 30 per cent of clear eggs and three full grown chicks which died in coming out of the shell, the memorandum made at the time reads: 'That all the remaining eggs contained dead germs in different stages of development. The hens were apparently in the best of condition and the eggs from them were large and full.' It may be noted that a Brown Leghorn pullet, one of the 26 hatched on February 26, laid her first egg on the 17th of July following, 4 months and 17 days after coming from the shell. Five days later two White Plymouth Rock pullets, and a cross pullet of the same group, laid their first eggs. Whether it is advisable to have such early laying pullets or not is shown on a following page.

MARCH AND APRIL EGGS.

The eggs of early March did not show much improvement. At end of the month the layers had opportunity to enjoy a run out, although to a limited extent. The effect on the vitality of the germ seemed beneficial, as is shown in the following results:—

On March 26, 13 White Plymouth Rock eggs were put under a broody Dorking hen. Result, 6 chickens ; 3 clear or unfertile eggs ; 1 addled egg, or one in which germ had started and then died ; 3 fully developed chicks dead at pipping stage.

On the day following, 27th instant, 13 White Wyandotte eggs were placed under a White Indian Game hen, and 13 B. P. R. eggs under a pullet of the same breed. The result in the first case was 9 chickens; 1 clear egg; 1 egg broken in nest by hen; 2 chicks dead at pipping stage. In the second, 8 chickens were hatched; 2 chicks dead in shell; 2 addled eggs. April eggs gave equally good results.

AN ASSUMPTION AND A WANT IN CONNECTION THEREWITH.

At the advent of spring the egg yield increased, and it was reasonable to assume that the hens which had not been laying in previous winter months were doing so then; also that the germs contained in their eggs were much stronger than in the eggs of the mid-winter layers. Was this actually the case?

A want that made itself felt in this connection was a means of detecting the non-productive hens from those which were regular layers. Close observation has led to the conclusion that only a small percentage of the fowls, noticeably so in the case of certain breeds, lay as frequently as is desired during the winter. On the arrival of spring a number of hens of the sitting varieties become broody, some earlier than others, and they are given eggs to hatch out. Yet the egg yield notably increases. The hens which have become broody are likely those which have been among the steady winter layers. If so their places have been undoubtedly taken by others. It is important to find out the tardy layers. Of course, no reference is made to the late hatched pullets of the previous year and which would not likely become productive until maturity at this season. A partial response to this exigency has been made in the shape of trap nests, of more or less merit, which in recent years have been placed on the market. In our department trial has been made of several patterns. Their use has led to the conclusion that they are certainly effective and valuable in the case of small flocks, but where there are many hundreds of hens, and labour saving is an object, they are likely to be a source of expense. And in this way: In the earlier half of the day the hens usually lay. During that period it would require, in a large establishment, so much attention on the part of one man to register the number of each layer, release her from and reset the trap as to fully occupy his time. To be reliable the work must carefully be attended to. It may be said that the value of discovering the non-productive hens, particularly during the season of high prices cannot be overestimated. Especially is this so in the case of the skilled breeder (as already mentioned) with his limited number of breeding pens of high class birds and who receives an unusually high price for his eggs which he sells for hatching exhibition birds. There is no intention to question the value of the trap nest to him. What is desirable is the extension of the trap nest principle, so that the proprietors or managers of the large establishments, who sell eggs for eating purposes, or for conversion into early broilers, may be enabled with little cost, certainty and despatch to detect the prolific layers from the non-productive ones.

DIFFICULTIES IN EARLY HATCHING FELT BY MANY PERSONS.

That the difficulties, as related in report of 1900 (last year), in connection with the early hatching of chickens were experienced by many others, was shown by the number of letters received during the early part of last summer on the subject. The

majority of the letters came from correspondents living in parts of the country where winter conditions are similar to ours, and told of early attempts at hatching and subsequent discouraging results. Many correspondents ended their letters with the statement: 'that this has been the worst year for early chickens ever known in this part of the country. It seemed almost impossible to have fertile eggs.' And again, 'the number of full grown chicks which were dead in the shell at hatching time was astonishing. They seemed unable to free themselves from the shell. Do you think my incubator is a good one?' An explanation of the cause and a remedy were generally asked for. In response a copy of report of last year, dealing in a preliminary way with the same difficulties, was at once forwarded. As to the results from the incubator the opinion was expressed that the probable fault was in the condition of the breeding stock rather than the machine. The statement 'that the experience was the worst ever known in that district' may be explained by the probability that efforts were made by more people, in the districts heard from, to have early chickens than ever before. The general demand in recent years for information as to the most reliable and easily operated incubators and brooders, and the expressed intention of purchasing them may fairly be taken as an indication that a large number are now in use, and the disappointing results, in connection therewith, may have called attention to obstacles to success which previously existed, but which were not so widely experienced. It is to be hoped that the attention which is now being directed by so many to the subject, apart from our experimental work, may lead to a solution of some, if not all, of the obstacles which at present seem to bar the way to unqualified success.

With this object in view it is requested of those who engage in the early hatching of chickens, and who meet with the difficulties outlined, to send to our department a description of the obstacles encountered and the suspected cause or causes.

THE FOOD AND ITS EFFECT.

It has been stated that past observations lead to the conclusion that next to the long term of artificial life in comparatively limited quarters, the food and its composition and frequency with which it is fed, has the greatest effect on the health of laying stock and vitality of germ. That such is recognized as an important influence is shown by the frequency with which the influence of the 'mash,' as a part of the daily ration, for good or bad, is discussed by leading breeders. On one hand we have the advocates of the 'dry' or 'whole grain' system of feeding, with the usual essentials of green food, grit, &c., and variety in the grains fed as well as manner of feeding. On the other side are those who combine the use of the mash with whole grains and the essentials. The contention of the first named is that the use of the mash is attended with injurious effect. Of the second party, that it is an important and wholesome incentive to the production of eggs in winter. The experience gained in our poultry department, after many years, points to beneficial effects when the mash is judiciously used. The following summary of the experience learned may be useful:—

1. When fed in too great quantity to one and two-year old hens it is apt to create an over-fat condition. In the case of the latter, if of the heavy breeds, this over-fat condition is likely to be fatal.

2. If fed in too great quantity as a morning ration it is likely to make the hens disinclined for exercise.

3. It is decidedly a valuable aid to moulting hens.

4. It is a convenient form of utilizing much of the farm and farm-house waste.

5. Where hens have had a comparatively free run its beneficial effect in egg production has been noticeable.

6. It is an invaluable means of quickly fattening old or young stock, in a more or less liquid form.

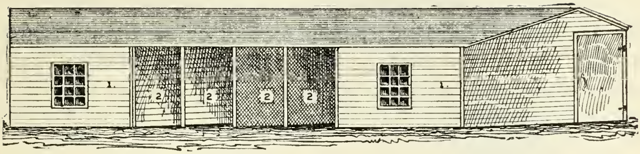
As to the quantities in which the mash should be fed, much depends upon its stimulating composition or otherwise. As ordinarily made it is composed of ground grains of different sorts with cooked roots or vegetables as a part. The mash as used by a farmer in the vicinity of Brockville, and described by him in a recent letter may be taken as fairly representative, viz.:—

'Morning ration for 250 hens and pullets, one and a quarter bushels of roots, pulped and made crumbly with provender. When provender alone is used, boiled meat is added.' The meat is presumably a form of waste. In many cases the soft feed is given in the afternoon. Under any circumstances the hour of feeding may be varied with benefit.

As to quantity in which it is to be fed, the practice in our department has been, when fed in the morning or at noon, to give enough to satisfy but not to gorge. Between the two extremes of too little and too much, as a morning or noon ration, doubtless lies the safety line. When fed as an afternoon winter ration, a large rather than small allowance is permissible, for there is the following long night fast to permit of leisurely assimilation. In some cases it is advisable, if the mash is fed in the early afternoon, to throw a few handsful of grain in the litter on the floor, where the layers may find it at that time, or, when daylight permits of search being made for it next morning.

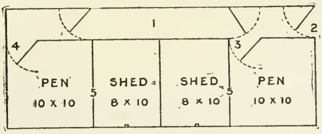
A PERTINENT QUERY.

Past observation has led to the conclusion that when the feeding of the mash, or any other form of rations, has had an enervating effect on the layers that strong germs are not likely to follow. This is more likely in the case of old hens of the heavy breeds. Indeed, no hen out of condition is likely to lay an egg with a strong germ. This leads to the query, are hens while in winter quarters and laying well during that period out of condition? In a state of nature the hen is not likely to lay in winter weather. We make the conditions of her winter life as like those of spring, or early summer as possible, and we get eggs, but they are not as reproductive as desirable. Are compromise conditions in the shape of 'poultry house and scratching shed' the correct ones? And in this there is room for useful and interesting experimental work. On this point it may be interesting to note the experience of Mr. William Moe, a farmer living at Franklin, Que., where the winter is rigorous and snowfall heavy. He says : 'We send our winter eggs to a Montreal grocer and receive 40 cents per dozen for them. Our plan of feeding grain is to throw it on the floor of the "scratching shed," so that the fowls will have to work to find it. We have the scratching sheds attached to our poultry houses. We got the plans from Mr. A. F. Hunter, of South Natick, Mass.' One objection to the scratching shed attachment, in certain parts of the country, has been the exposure of the laying stock to the cold of winter, but Mr. Moe evidently does not find this an obstacle to obtaining eggs in winter. Strong advocates of poultry houses, constructed on similar plans, are Mr. L. H. Baldwin, of Deer Park, Toronto, and Mr. J. M. Wilson, Manager of the Toronto Poultry Farm. Both have adopted the principle in the construction of their poultry houses, the latter on an extensive scale. The following diagram will show a poultry house with the shed attachment:—



FRONT ELEVATION.

1. Roosting and laying room. 2. Scratching shed.



1. Passage way.
2. Door.
3, 4. Entrance to pen.
5. Passage way to sheds There may be more than one.

GROUND PLAN.

The objection to the use of the open scratching shed, in the colder parts of the Dominion, that it is too exposed to the cold and snow storms of winter has been to a great extent overcome by having a thick cotton curtain in front of each shed to be pulled down in case of a storm and rolled up on fine, sunny days. In some cases a covered shed has been found to answer. Many farmers have opportunities for allowing their fowls a run, on fine days, in an open shed with southern face. In several cases, known to the writer, farmers have their poultry houses so arranged that their fowls have regular access to open sheds into which the sun shines brightly on many winter days. In the above diagram it would be an improvement to have the roosting and laying houses the smaller of the two, and the scratching shed of the larger dimensions. It is safe to allow no less than six square feet of floor space, under any circumstances, to each hen and as much more as can conveniently be spared.

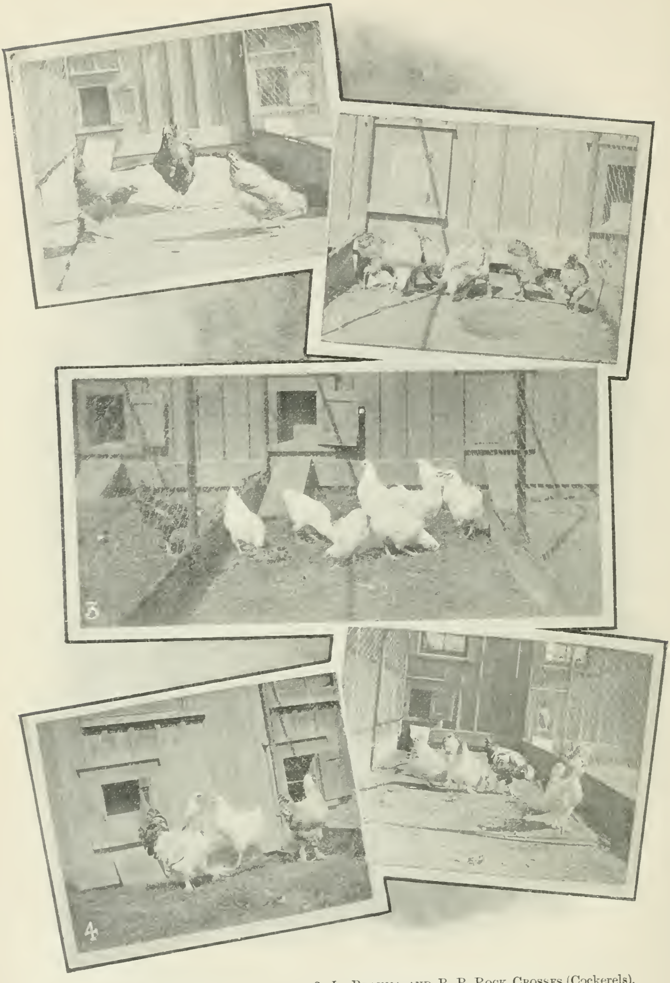
BREEDING PENS MADE UP.

On the fowls going into winter quarters the following pens of fowls were mated with vigorous young males in order to obtain, if possible, early and strong chickens. The results of this experimental work are given in previous pages:—10 White Leghorn hens, 15 Brown Leghorn hens, 10 Black Minorca hens, 6 White Minorca hens, 11 Barred Plymouth Rock hens, 8 White Plymouth Rock hens, 14 mixed hens.

In addition to the foregoing the following were added at the dates designated:—

1901.	Description.	Hens.	Pullets.	Cocks.	Cockerels.
Jan. 4	Langshans	11		1	
" 9	Barred P. Rocks		9		1
" 9	Buff Leghorns	9			1
" 11	Andalusians	11		1	
" 17	White P. Rocks		9		1
" 17	White Wyandottes	9		1	
" 17	Langshans		8		1
" 17	Buff Leghorns		8		1
Feb. 25	Barred P. Rocks	9			1
Mar. 20	Black Minorcas	7			1
	Crosses.				
Mar. 20	L. Brahma-P. Rock	9			1

As the hens became broody they were placed in wooden boxes, without bottoms, and with a hinged door in front. For early sitters one of the Wyandotte varieties, or one of the cross-bred hens were chosen as they were lighter than the heavier Plymouth Rocks or Leghorns. In some cases the nests were made of dry lawn clippings, which were found to answer the purpose admirably. In others oat straw was used. Three or four china eggs were placed in the nest, and on these the hen was allowed to sit for a couple of days. Meanwhile a thorough dusting of insect powder was given to both hen and nest. The powder in the feathers of the hen and in the nest probably rid her of any vermin and prevented their lodgment in the straw or grass. At end of two days the valuable eggs were given to the sitter. Food, water and grit were convenient to the sitters at all times. When the sitters left their nests to feed, generally in the morning, the eggs were examined. Should an egg have been broken it should be at once removed with the soiled straw, and the other eggs at once carefully washed in slightly warmed water and returned to the nest. Should the eggs be allowed to remain soiled no satisfactory results need be anticipated. In some cases the breast feathers of the sitters became soiled. If so they should be at once thoroughly cleaned, or the newly washed eggs will again be soiled. If circumstances will permit a number of broody hens should be set at the same time. At the end of six or seven days the eggs with light coloured shells, and at nine days the eggs with dark shells, should be tested, and the clear or unfertile ones removed. The fertile eggs should then be given to the hens which may require them, in order to have the full sitting, usually 13. The spare hens can then be reset. Egg testers can be procured, without any difficulty, from a dealer in poultry supplies. Where incubators and brooders are used, different rules as to care and management are observed. These rules accompany all the machines. But whether hens or incubators are used as hatching mediums, care and attention during the period of incubation are necessary. In too many cases the hens, or incubators, have to bear the blame that rightfully should be borne by manager or operator.



1. Buff Orpingtons.
2. L. Brahma and B. P. Rock Crosses (Cockerels).
3. White Wyandotte Pullets.
4. Cross Bred Cockerels Fattening.
5. Salmon Faverolles.

EGGS SET AND CHICKENS HATCHED.

The following list will show the number of eggs set and result in chickens:—

Date.	Description of Eggs.	When Hatched.	No. of Chicks.
Mar. 26	13 White Plymouth Rock eggs	April 16	5
" 27	13 White Wyandotte eggs	" 17	9
" 27	13 Barred Plymouth Rock eggs	" 17	8
April 18	13 " " from Grand Pré, N.S.	May 9	8
" 18	13 " " " "	" 9	10
" 19	13 White Wyandotte eggs	" 10	8
" 19	13 White Plymouth Rock eggs	" 10	10
" 22	13 Buff Leghorn eggs	" 13	10
" 30	13 Light Brahma-Plymouth Rock eggs	" 20	12
" 30	13 " "	" 20	8
May 1	13 Barred Plymouth Rock eggs	" 21	9
" 1	13 Buff Leghorn eggs	" 21	9
" 2	13 Barred Plymouth Rock eggs	" 23	10
" 2	13 White Leghorn eggs	" 23	11
" 2	13 Buff "	" 23	8
" 4	9 Light Brahma—4 White Wyandotte eggs	" 25	7
" 10	14 Barred Plymouth Rock eggs	" 31	11
" 11	15 Light Brahma—Plymouth Rock cross eggs	June 1	11
" 11	13 Black Minorca eggs from Gatineau Point	" 1	3
" 13	13 White Wyandotte eggs	" 4	7
" 13	13 White Leghorn eggs	" 4	7
" 15	13 Barred Plymouth Rock eggs from Ottawa East	" 6	7
" 18	15 Buff Leghorn eggs from Cobourg	" 9	7
" 22	13 Barred Plymouth Rock eggs from Ottawa	– 13	10
" 23	13 White Wyandotte eggs	" 14	9
" 24	13 " "	" 15	8
June 18	13 Barred Plymouth Rock eggs from Ottawa	July 10	11
" 18	13 " "	" 10	8
" 21	7 Barred Plymouth Rock—8 White Wyandotte eggs	" 12	10
	384		251
	(A little over 65 per cent of the above eggs hatched.)		
	Incubator-hatched chickens		145
			396

After hatching, the chicks were allowed to remain under the hen, or in incubator, until strong on their legs. This may be 24 or 36 hours after coming out of the shell. If incubator-hatched the chickens were removed to brooders, which, if the season was advanced enough, were placed outside. If hen-hatched, and the weather permitted, the mother hen and her brood were placed in coops which were put on the grass of a field. The grass in this portion of the field was kept short by grass mower, and the field was surrounded by wire netting. The coops had slatted fronts and were so arranged as to permit of their being securely fastened at night, while abundant ventilation was provided. From time to time the coops were moved to new ground. As in past years on removing the hen and her brood from the nest, the hen was given food and water before placing her in the coop with the chicks. She had been on the nest for 36 hours, hatching out her chicks, and during that time had partaken of no food or drink, and was probably much in need of both. If not so fed she is likely to greedily eat up the comparatively dainty food intended for her brood. Again, her hunger and thirst being appeased she was much more likely to brood her chicks in quiet than if allowed to remain in want of food and drink. The first feed of the chicks was stale bread crumbs, followed some hours later by stale bread soaked in skimmed milk and

squeezed dry. This was fed a little at a time and often. Never in quantity enough to gorge, and none was allowed to remain about to turn sour. After a day or two granulated oatmeal was given, and when convenient boiled rice. This food was given for a week or ten days when a change was gradually made to a mash composed of stale bread, oatmeal and cornmeal mixed with skimmed milk and fed in a crumbly condition. Skim milk and water with fine grit were also provided. No grain was given until the 12th or 14th day, and then it was fed a little at a time and at night, until the chicks were accustomed to it, when they were sent to brood for the night with their crops full. Wheat was found the most satisfactory grain. As his chicks progress the farmer should be able to utilize the table and kitchen waste, such as broken crusts, potatoes, potato peelings, unused oatmeal or cornmeal porridge, &c., &c., with great benefit. Salt and fat meat should not be used, and the peelings, &c., thoroughly cooked. The feed should be wholesome, plain, nutritious and need not be expensive. The chickens require care and attention during the first five weeks of their growth, for during that period they are slowly but surely feathering. The chicks of the Leghorn and kindred types will be found to make the most rapid development during the first few weeks, but those of the heavier breeds, such as Plymouth Rocks, Wyandottes or Orpingtons, will later on more than compensate by gain in weight. The mother hens should be allowed to remain with their chickens until the latter are fully feathered. They should then be removed to the runs with the other hens, and if in good condition by this time should be laying or about to do so. With such care and treatment as outlined at end of three or three and a half months the birds should be ready for sale, to either private customer, to city store, or to one of the large purchasing companies, which are being formed in different parts of the Dominion. At the age mentioned and with the care and food as advised, the young cockerels of the Plymouth Rock and Wyandotte breeds and Buff Orpington variety should weigh 3½ pounds or 4 pounds each. And the earlier they attain these weights the better price will they bring. A good plan is to put the chickens in crates and feed them well for three weeks before selling them. The benefit of so doing is shown further on.

WEIGHT DEVELOPMENT OF THE CHICKENS.

Treated and cared for as outlined from time of hatching the farm chickens made rapid and satisfactory development, as the following figures will show. The chicks were hatched in incubators and reared in brooders, while others were hen-hatched and reared.

Incubator-hatched on 26th February. Weighed on 4th June following, 3 months and 5 days of age.

	Lbs.	Oz.
Barred Plymouth Rock Cockerel	3	5½
White Wyandotte Cockerel	3	5½
Light Brahma—B. P. Rock Cross-Cockerel..	3	5
Light Brahma—C. Dorking Cross-Cockerel	3	8

Such chickens as the above would command a handsome price, but as they require special facilities to rear them during the month of March and the early part of April, the farmer with his ordinary means is not likely to have them. But with the aid of incubator and brooder the farmer should be able by the first or second week in May, most likely earlier, to have a large number of chickens hatched and growing rapidly in a brooder, or brooders, with opportunity for the young birds to run out on the rapidly

growing grass. By means of hens he is not likely to have similar results, for it is only the winter layers which will make the early sitters, and then only in limited number. The non-winter layers beginning their output of eggs in spring, will lay their quota before becoming broody, and their chickens are more likely to be brought out in mid-June than early May.

Proof of this will be found by reference to the table of eggs set and chickens hatched, to be seen in a preceding page. This table shows that three early sitters were available on the 26th and 27th March. They were placed on eggs at the dates mentioned, and hatched out 22 chicks in April. Four other sitters were set on 18th and 19th of April, and hatched 36 chickens, making with the 22 chickens hatched in April a total of only 58 chickens by middle of May. And the hens of the poultry department had laid fairly well during the previous winter. With the same percentage of strong germs, which gave 8 and 10 chicks out of 13 eggs, as the table also shows, and an incubator of 220 egg capacity the farmer should have 170 to 175 strong and robust chickens. The moral is obvious.

PROGRESS MADE BY CHICKENS FED IN CRATES.

On the 1st day of August the four cockerels hatched in an incubator on 26th February, were put in fattening pens upstairs, and were hand fed three times per day on a ration of two parts ground oats, one part shorts, one part cornmeal, the whole being mixed with skimmed milk. Quantity fed per day, one pound. The following gains were made:—

Varieties.	Aug. 1.		Aug. 7.		Aug. 15.		Aug. 21.		Aug. 28.		Sept. 4.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
1. Light Brahmas and P. Rock cross .	5	10	6	1	6	9	6	12½	6	14½	7	3½
2. " C. Dorking cross	5	12½	6	5	6	12½	7	2½	7	9½	7	12½
3. White Wyandotte......	5	12½	6	2½	6	10½	6	14½	7	4½	7	9
4. White Plymouth Rock.............	4	5	4	5½	....		4	14½	5	2½	5	9½

Soon after being put into the pen the White Plymouth Rock cockerel became sick, and was replaced on 21st August by another of the same breed.

All the birds were moulting previously to, or began to moult heavily soon after being placed upstairs. This, no doubt, was a drawback to rapid flesh making. The lesson taught by this experience is that birds should be put into the fattening pens either before or after they begin to moult, at 4½ or 5 months of age, preferably the earlier period.

EXPERIMENTS WITH BIRDS IN FATTENING CRATES, LIMITED AND UNLIMITED RUNS.

In order to ascertain the difference in gains made by birds in fattening crates, limited and free runs, the following comparative tests were made:—On 12th August two groups of 4 chickens in each group, and of same age, viz., 4 months and 3 days, were selected and bands with distinguishing numbers placed on one of the legs of each bird. The rations were composed of coarsely ground grains, such as farmers would likely have at hand, and of the following description and quantity, viz.:—2 parts cornmeal, 1 part coarsely ground oats, 1 part shorts or buckwheat meal.

Group 1.—In fattening crate upstairs.

Variety.	Aug. 12.		Aug. 19.		Aug. 26.		Sept. 2.		Sept. 9.		Sept. 17.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
No. 34. White Wyandotte	4	10½	5	00	5	4½	5	6½	5	7½	5	12½
No. 33. "	4	6½	4	13½	5	6½	5	12	5	14	6	3½
No. 39. "	4	2½	4	10½	5	2½	5	½	5	4	5	10
No. 47. Barred Plymouth Rock.......	5	2½	5	9½	6	0	6	5½	6	10	7	0

Group 2.—Limited run.

Variety.	Aug. 12.		Aug. 19.		Aug. 26.		Sept. 2.		Sept. 9.		Sept. 17.	
No. 30. White Wyandotte..........	4	1½	4	9	4	13	5	2½	5	4½	5	8
No. 40. "	4	1½	4	7	4	11½	4	14	5	0	5	2
No. 61. "	3	11	4	0	4	3	4	9½	4	12½	5	2
No. 67. "	3	14½	4	4	4	8	4	10½	4	15½	5	2

The following will show the gains made by chickens placed in fattening pens upstairs and others on a free run. On 19th of August four Light Brahma B. Plymouth Rock cross-bred cockerels, incubator-hatched, were picked from a number running in a field. The birds were all three months of age. Leg bands with distinguishing numbers were placed on the chickens. Two were placed in fattening crates upstairs, and the other two were allowed to run in a field. The following figures will show results:—

In Fattening crate upstairs.

Variety.	Aug. 19.		Aug. 26.		Sept. 2.		Sept. 9.		Sept. 17.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
No. 2. Light Brahmas-Plymouth Rock cross......	3	9	4	2½	4	10½	4	15½	5	7
No. 3. " " "	3	10	4	4½	4	12½	5	4½	5	13½

Allowed free run.

Variety.	Aug. 19.		Aug. 26.		Sept. 2.		Sept. 9.		Sept. 17.	
No. 50. Light Brahmas-Plymouth Rock cross.....	3	8½	3	14	4	5	4	7	4	13½
No. 9. " " "	3	3½	3	9	4	0	4	0	4	3½

BUFF ORPINGTONS, RHODE ISLAND REDS AND SALMON FAVEROLLES ON TRIAL.

During the latter part of the summer season three comparatively new comers were added to our poultry department, viz., Buff Orpingtons, Rhode Island Reds and Salmon (or Saumon) Faverolles. Briefly described some of the characteristics of the new varieties are as follows:—

Buff Orpingtons.—One of three varieties of a well-known English breed composed of White, Black and Buff varieties. They are strongly recommended as winter layers and rapid flesh formers. The Buff variety have light legs and a white flesh which make them particularly suited to the requirements of the English, as well as home markets. Figures showing flesh development are given further on.

RHODE ISLAND REDS.—As their name indicates is of eastern United States origin, and are said to be good winter layers, hardy and quick growers. Owing to a pronounced yellow colour of leg and tinge of flesh, they are likely, for the present at any rate, as a market fowl to be more suited to the United States taste for yellow skin, than for export. This at once limits their field of usefulness as compared with the Buff Orpington.

SALMON FAVEROLLES.—Are of French origin, although bred for some time past in England. They are the first of this breed to be brought to Canada, and are found in only one place in the United States, viz., the States Valley Farm of Simsbury, Conn. The Salmon or Saumon Faverolle is the most preferable of several types. It is a mixed breed with Houdan, Dorking, Brahma, and may be Cochin, showing in one fowl. Their merit is said to be that of a table fowl of small bone and fine quality of flesh. And undoubtedly they are such. In the Parisian market they bring the highest price. Mr. T. H. Robinson, the English Faverolle breeder, says of them : 'that they will attain a size and weight, with less trouble, than some of our finer breeds and a young fowl of this breed will leave nothing in the way of quality to be desired.'

FLESH DEVELOPMENT OF FOUR BUFF ORPINGTON COCKERELS.

With a view of finding out their merit as flesh formers, on the 26th August four Buff Orpington Cockerels were purchased from a breeder near the city. They were hatched on 1st of June, and had received no special care or feeding. One bird showed evidence of neglect.

Four Buff Orpington Cockerels hatched 1st June, 1901. Placed in pen with Limited run on 2nd September following at 3 months and 2 days of age.

Variety.	Sept. 2.		Sept. 9.		Sept. 16.		Sept. 23.		Oct. 2.	
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.
No. 21	3	7½	3	12½	4	4	5	½	5	10½
No. 12	3	12½	4	½	4	9	5	½	5	11
No. 20	3	9½	3	15½	4	6	5	3½	....	.....
No. 25	2	13½	3	2	3	8½	4	2½	4	12

These birds were not weighed again until the 11th November following, at age of 5 months and 11 days, when they were compared with White Wyandotte cockerels of age of 7 months and 2 days. Conditions as to care and feeding were the same in both cases.

Four Buff Orpingtons, at age of 5 months 11 days:—

	Lbs.	Oz.
No. 21	7	2
No. 12	7	2½
No. 15	6	½
No. 20	5	10

Four W. Wyandottes, 7 months 2 days old:—

No. 61	7	2
No. 67	6	13½
No. 40	6	7½
No. 30	7	4½

PROGRESS OF SIX RHODE ISLAND RED COCKERELS.

Six Rhode Island Red Cockerels hatched at different times during the month of May, were purchased from a breeder in Nova Scotia, and had been taken from a free run in the fields when shipped. They were strong and healthy chickens, but thin when received on 27th September. On the 4th of October they were placed in a pen, with limited outside run, when the following flesh development was made. Rations same as given to other chickens, viz., 2 parts coarsely ground oats, 1 part cornmeal, 1 part shorts. This ration was altered from time to time, ground barley sometimes taking the place of shorts and cornmeal at others.

SIX RHODE ISLAND REDS PLACED ON LIMITED RUN.

—	Oct. 7.	Oct. 14.	Oct. 21.	Oct. 28.	Nov. 4.	Nov. 11.
No. 16	4	4·14	5·12	6	5·14	6
" 14	4·4½	5·6½	6	6·6	6·14½	6·14
" 25	5·3½	6	5·2	5·14½	6·7½	6·7½
" 27	3·12	4·7½	4·12½	4·15½	4·15½	5
" 39	4·7½	5·2	4·12½	5·4½	5·3½	5·8
" 8	4·12	5·10½	5·11½	6	6·3½	6·5

A THREE MONTHS OLD CHICKEN WANTED.

The large poultry purchasing companies in Canada call for a three months old chicken as being best suited to the wants of a certain class of customers in our home and the English markets. The chickens are wanted early and in numbers. There should be no difficulty in our farmers having such chickens by end of July or beginning of August. A fear has been expressed that a chicken of this age will not have weight. The following is the best answer. It is a result that has been attained in our department for many years, and not only by us but by many farmers:—

Barred P. Rock Cockerel, hatched 10th May; weight on 10th August, 3 pounds.

White P. Rock Cockerel, hatched 10th May: weight on 10th August, 3 pounds.

Barred P. Rock Cockerel, hatched 17th April ; weighed on 17th July, 3 pounds 6 oz.

White Wyandotte Cockerel, hatched 17th April; weight on 17th July, 3 pounds 5 ounces.

White Wyandotte Cockerel, hatched 17th April; weight on 17th July, 3 pounds 4 ounces.

L. Brahma P. R. Cross-Cockerel, hatched 17th May; weight on 19th August, 3 pounds 9 ounces.

L. Brahma P. R. Cross-Cockerel, hatched 17th May; weight on 19th August, 3 pounds 10 ounces.

COMPOSITION OF FARM RATIONS AND MANNER OF FEEDING THEM.

The composition of the farm rations at present being fed, with the view of egg production, is much the same as those of previous years, but the time of feeding slightly differs. Last year mash was fed to the hens in the morning three times per week. On the remaining mornings cut green bones were given instead. At noon a light feed of oats, and at night whole grain. The pullets received mash twice per day in small quantities, and cut bone three times per week, with whole grain for afternoon ration.

When cut bone was given the mash was not fed. But this treatment was found too fattening for the Plymouth Rock pullets, and the rations and times of feeding them were made the same as with the older stock.

The rations this year are fed as follows:—

To 110 Hens, One to Two Years Old.—In morning, 8 pounds wheat. Noon, 5 pounds ground grains (measured dry) made into mash. Afternoon, 8 pounds wheat or buckwheat. Three times per week 8 pounds cut bone are given in lieu of the mash. Mangels regularly given and pure water, grit and ground oyster shells are in abundant supply. Sometimes steamed lawn clippings take the place of the mangels. The ground grains for the mash are 2 pounds coarse ground oats, 2 pounds cornmeal, 1 pound shorts.

The reason for feeding the whole grain in the morning is that scattered in the litter on the floors of the pens, the hens start at once to search for it, and exercise is so induced. The whole grain in the afternoon is calculated to send the fowls to roost with their crops fairly well filled.

To 150 Pullets of Different Ages.—Morning ration 10 pounds grain, principally wheat. Noon, 10 pounds mash. Afternoon, 10 pounds grain. Three times per week 10 pounds of cut green bones take the place of the mash. The ground grains composing the mash are: Cornmeal, 5 pounds; coarsely ground oats, 3 pounds; shorts, 2 pounds.

The essentials such as roots, grit, oyster shells and pure water are in regular supply. The reason for adopting the above method of feeding the pullets is the same as in the case of the hens.

COST OF RATIONS.

Every effort has been made to have the rations as cheap and effective as possible. All kinds of feed are, at time of writing, and have been for some months exceptionally high and in sympathy therewith the price of eggs and poultry has risen above the average of previous years. Calculating at present values, the price of the rations is put as follows:—

RATIONS FOR 110 HENS FOUR TIMES PER WEEK.

	Cts.
16 pounds wheat at 75 cents per bushel	20
5 pounds ground grains for mash	6
Lime, grit, mangels, &c	3
	29

OTHER DAYS.

16 pounds wheat	20
8 pounds cut green bone at 1 cent per pound	8
Lime, grit and mangels	3
	31

RATIONS FOR 150 PULLETS FOUR TIMES PER WEEK.

20 pounds wheat	25
10 pounds mash	12
Lime, grit and mangels	37

When mash is not fed on remaining three days it is replaced by 10 pounds cut green bone at 1 cent per pound, 10 cents.

To the price of the cut bone is to be added the cost of cutting it, which would be the time of a man for an hour three times per week.

WHEN THE PULLETS BEGAN TO LAY.

The pullets hatched in incubator on 26th February, laid as follows:—

1 Brown Leghorn pullet (4 months 20 days old), July 17, 1901.
2 White P. Rock pullets (5 months of age), July 28, 1901.
1 Cross-bred pullet (5 months of age), July 28, 1901.
1 White P. Rock pullet (5 months 3 days old), August 1, 1901.

Other pullets laid at the following dates:—

Buff Leghorn, hatched 23rd June; 21st November.
Rhode Island Red, hatched in May; 25th November.
Langshan, hatched in April; 1st December.
White Wyandotte, hatched in May; 2nd December.
B. P. Rock, hatched in May; 3rd December.
White Leghorn, hatched 4th June; 7th December.

In August last, 4 Buff Orpington and 4 Faverolle pullets were imported from England. On September 2, the month following one of the Buff Orpington pullets, laid and continued to do so until the 13th of the same month when she became broody, but was broken up. The pullets were evidently early hatched, and it is quite possible that she may have been laying before leaving England.

On the 9th September, a Faverolle pullet laid apparently her first egg.

DID THE EARLY HATCHED PULLETS MOULT?

The early incubator farm hatched chickens (26th February) did moult in the fall, and while doing so ceased laying. The cross-bred pullet laid but a few eggs when it became broody, but was put in a pen by herself and broken up. The imported Orpington pullets, although apparently early hatched, did not moult. The Faverolle pullets began to moult on going into winter quarters. Further experience is required before a decision can be arrived at as to whether the early incubator-hatched pullets are better for fall layers, when the majority of hens are moulting, than late April or early May-hatched birds. If the early incubator-hatched pullet begins to lay in July or August, when eggs are cheap, and commences to moult in October or November, when the price of eggs is becoming higher, the later May-hatched chicken, which usually begins to lay in November and continues to do so without stoppage, is the more valuable bird of the two. But this remains yet to be decidedly proved. On this point the experience of those who have had early hatched-incubator chickens would be very acceptable and useful. It is a matter of no little importance.

GOOD LAYING BY THE BUFF ORPINGTON PULLETS.

During the fall months the Orpington pullets, with one exception, laid from time to time and were not pushed to do so. The exception was a pullet which had evidently become sick on the voyage out, for she had incipient roup on her arrival at our poultry department. She was at once separated from the rest, and with care and treatment was brought to comparatively good condition. She was put with the others in the second week of December, and soon after began to lay.

The record of three pullets for the first half of the month of December, and of the four for the latter portion is as follows:—

—	—																															Total.
Days of the month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
No. of eggs laid by 4 Buff Orpington pullets in Dec., 1901...........	2	3	1	3	2	2	2	3	2	1	1	2	2	2	2	2	2	2	2	2	2	1	3	3	2	2	4	4	2	1	3	67

AN EARLY MOULT—COMMENCEMENT OF WINTER LAYING.

The one and two-year old hens moulted early, and went into winter quarters in good condition. Winter laying commenced on the 23rd of November. At that time the weather had turned cold and there was a snow fall which necessitated the closing in of the different pens for the winter.

Every effort was made to shorten the moulting period, which is really one of non-production, and gratifying success was attained. The following treatment was adopted. During the first week in July the sending out of eggs for hatching purposes had ceased, and the breeding pens were broken up, the male birds being removed to a building with small pens and limited runs. The hens were allowed to run in small fields in rear of the poultry buildings. During the first two or three weeks in July their rations were reduced one-half, the mash being fed only once per week, and one-half in quantity. At end of July the full rations were resumed, and the mash was fed three times per week, but was mixed with cold instead of hot water. As it was not convenient or desirable to feed cut bone during the hot weather of August, a preparation of meat (Spratt's Crissell) was mixed in the mash, in the proportion of 3 to 5 pounds per hundred hens. The half rations were ½ pound wheat or buckwheat to every 15 hens of the Mediterranean classes, and to every 20 hens of the heavier breeds. When buckwheat is used in summer it is better to mix oats with it. The half ration of mash was fed in the same proportions. Bran was used as a part of the mash. The full ration of mash was composed of coarsely ground oats, 2 parts; shorts, 1 part; cornmeal, 1 part, with Spratt's Crissell in quantity of one pound to every 15 or 20 hens. Pure water for drink was always at hand. The fields furnished clover and grass. The response to this treatment was the shedding of the old feathers and the appearance of the new ones. By the end of September or first week in October, some much earlier, the hens were over their moult and looking remarkably well. From the results obtained and observation during the moult it seemed as if it were possible to shorten the season of non-production to a still greater extent. One result in the shortening of the rations was to at once reduce the egg production to almost nothing. The remarks of Dr. N. W. Sanborn, a recognized authority of the United States, in his work on 'Poultry Diseases,' says of the moulting period: 'So many birds pass through the moulting process with difficulty, if not disease, that it is well to call attention to it. A moulting hen is easily fattened. Hence, at this period, feed lightly of those foods which produce fat. Corn, cornmeal, middlings, potatoes, must be used sparingly. Increase the amount of green bone, bran and skim milk. A run in a field of clover will be a help. Do not try to hasten the time of the moult by keeping in a warm pen or by feeding cotton seed or linseed meal. Keep all males by themselves during the moulting season. The hens should be sheltered from storms or cold rains. The ideal place for a run is an apple orchard where in addition to the grass may be found insects in fallen fruit, &c. Birds should go into the moult not fat, free from lice and with no red mites in the house.' This extract was given in report of 1896, but is valuable enough to warrant its repetition.

RED MITES. AN INQUIRY AND REPLY.

The following note and answer will convey information that will doubtless be useful to many poultry keepers:—

'ELGIN, ONT., December 23, 1901.

'Manager Poultry Dept.,
'Experimental Farm, Ottawa.

'SIR,—Will you be kind enough to tell me what will get rid of lice on hens and in their house? In the summer the house and roosts swarmed with little insects that could scarcely be seen. And they are still in the house. If I go in I am covered with them. I have used a good deal of stuff, but cannot get rid of them. Hoping to get a remedy for them.

'J. J. K.'

A reply was sent that the fowls should be carefully dusted with carbolic powder. If the fowls were in large numbers one of the liquid preparations was advised as the most speedy way in which to meet the difficulty. These liquid lice-destroying preparations have, in recent years, been put upon the market and are said to be efficient. For red mites the following remedy was advised:—A solution of

Corrosive sublimate..	4 ounces.
Common salt..	4 "

Dissolve in two to four quarts of water. When completely dissolved dilute to 25 gallons.

With this carefully spray every crevice, nook and corner of the house.

As the solution is highly poisonous, care should be observed in handling it.

Follow by whitewashing the premises. Before returning the fowls to the poultry-house see that they are entirely free from vermin. This treatment has been found efficacious in many cases, and is the quickest and surest method of getting rid of the troublesome pests. A good plan to prevent the lodgment of lice on the roosting places and platforms is to dampen both roosts and platforms once every ten or fourteen days with coal oil. Scaly leg will also be prevented.

DISEASES OF POULTRY.

Symptoms of many diseases of poultry were described and remedies asked for during the year. Many of the ailments were forms of liver affection due to overfeeding and lack of exercise, particularly in the case of two and three-year old hens of the heavier breeds. A liver pill and a change in the manner of feeding the rations and quantity fed were advised. Many cases of cold and slight catarrh were also reported. In such cases the removal of the cause, if apparent, was advised with the use of a good condition powder and roup pills, when easily procured. Coal oil in the incipient stages is recommended.

STOCK ON HAND IN DECEMBER.

Breeds.	Hens.	Pullets.	Cocks.	Cockerels.
Barred P. Rocks	10	30	1	12
White "	8	14	....	4
Buff P. Rocks	....	7	....	1
White Wyandottes	10	18	1	15
Langshans	10	6	1	2
Light Brahmas	....	....	1	
Faverolles	....	4	....	1
Buff Orpingtons	....	4	....	2
Brown Leghorns	8	6	1	2
White "	4	10	1	6
Buff "	14	12	1	3
Andalusians	8	....	1	1
Black Minorcas	8	3	1	
White Indian Games	6	....	1	
White Minorcas	5	....	1	
Rhode Island Reds	....	7	....	4
L. Bra.-P. Rock Cross	3	15	....	1
Mixed Fowls	19			
	113	136	11	54

Eggs laid by different breeds from December 1, 1901, to June 30, 1902.

Breeds.	1900. Dec.	1901. Jan.	Feb.	Mar.	April.	May.	June.	Totals.	Remarks.
10 W. Leghorn hens	24	38	34	70	135	141	73	515	
10 B. Minorca hens	61	96	120	145	135	100	65	722	
5 " pullets	......	36	68	73	76	38	65	356	
9 Andalusian hens	2	34	53	83	115	104	87	478	
15 Brown Leghorn hens	39	87	101	168	192	207	129	923	
7 Langshan hens	5	68	70	79	67	40	21	350	As the season advanced the hens of the setting breeds became broody and were given eggs, or broken up.
7 " pullets	10	71	47	64	81	87	34	394	
11 B. P. Rock hens	35	35	48	85	87	73	65	428	
20 " pullets	80	299	312	281	218	141	45	1,376	
8 W. P. Rock hens	38	74	68	82	94	98	49	503	
6 " pullets	5	44	59	64	67	57	53	349	
4 W. Wyandotte hens	35	63	56	54	5	Broody.		213	
12 " pullets	5	68	124	129	157	75	56	614	
6 W. Minorca hens	13	51	43	61	69	55	54	346	
6 Buff Leghorn hens	47	61	56	74	80	60	45	423	
10 " pullets	55	81	94	90	110	62	57	549	
14 Mixed hens	55	82	133	189	189	118	90	856	These hens were mostly first crosses.
11 " pullets	12	90	130	144	216	174	105	871	
8 White Ind. Game hens	30	52	34	109	110	53	75	463	
	551	1,430	1,650	2,044	2,203	1,683	1,168	10,729	

NUMBER of Eggs Laid from December 1, 1900, to November 30, 1901.

1900.	
December	551
1901.	
January	1,430
February	1,650
March	2,005
April	2,126
May	1,711
June	1,134
July	465
August	335
September	181
October	222
November	198
	12,008

Experiments in preserving eggs, by Mr. F. T. Shutt, Chemist of the Experimental Farms, have been continued during the past season, and a report made by Mr. Shutt on this subject will be found appended.

OTTAWA, December 28, 1901.

THE PRESERVATION OF EGGS BY FRANK T. SHUTT, M.A.,

Chemist, Dominion Experimental Farms.

The results of the experiments in egg preservation commenced in 1898 and continued in 1899 and 1900, have already been published in the annual reports of the Experimental Farms. They go to show that of all the preservative fluids and methods used none gave such uniformly satisfactory results, as regards quality of the preserved egg, as saturated lime-water, and, further, that this was the least expensive and most pleasant to handle of all the fluids employed.

Further trials have been made during the past season, using (1) lime-water, (2) lime-water containing 1 per cent common salt, (3) lime-water containing 2 per cent common salt, (4) common salt, 1 per cent, (5) common salt, 2 per cent. We also tested the efficacy of the following methods:—(6) smearing the eggs with vaseline and (*a*) immersed in lime-water, and (*b*) set away in rack, (7) covered with paraffin and immersed in lime-water, and (8) dipping in saturated solution of potassium permanganate and set away in rack, (9) sodium aluminate, 5 per cent solution. The experiments began May 14, 1901, and the eggs were examined on December 14, 1901, a period of 7 months.

Saturated Lime-water.—'White,' somewhat more limpid than in fresh egg and tinged faintly yellow. Yolk, globular, and in one or two eggs, attached to shell. No offensive smell, and appearance, both externally and internally, good. Discoloration of 'white' somewhat more pronounced on poaching with development of very faint musty odour. Though not equal to fresh egg in flavour, they are quite usable and in no degree offensive.

Saturated Lime-water, containing 1 per cent common salt.—Very good as to appearance, both externally and internally; 'white,' very slightly tinged, but a little more limpid than in saturated lime-water alone. Yolk, globular; air-space, normal. Faint odour, somewhat more strongly marked on poaching. Nothing disagreeable in uncooked or cooked egg; quite usable, but lacking the flavour of a fresh egg. Compared with eggs in saturated lime-water only, they are on the whole perhaps slightly superior.

Saturated Lime-water and 2 per cent common salt.—'White,' quite limpid and slightly brownish. Fairly well preserved, but not equal to eggs in either of the foregoing liquids.

Common salt, 1 per cent solution.—In appearance, both externally and internally, four of the eggs were very similar to those kept in lime-water, but they possessed a more marked musty odour. In two of the eggs the 'white' was limpid and yellowish, the yolk had lost its globular form, and the smell was disagreeable.

Common salt, 2 per cent solution.—'White,' very limpid. Yolk, reddish-black and of the consistency of jelly; very bad smell. All the eggs were quite spoilt and unusable.

Eggs smeared with vaseline and kept in lime-water.—'White,' more markedly discoloured than those in lime-water simply; musty smell, somewhat inferior to eggs kept in lime-water without vaseline covering.

Eggs smeared with vaseline and kept in rack.—'White,' slightly discoloured; possesses faint musty odour, but fairly good; apparently somewhat better than eggs in preceding test.

Eggs covered with paraffin and kept in lime-water.—'White,' slightly tinged with yellow; yolk, thin and degraded in one or two of the eggs; musty smell. Eggs decidedly inferior to those in lime-water simply. External appearance rough and unattractive, due to paraffin.

Eggs dipped for half a minute in saturated permanganate of potash solution, and kept in rack.—Eggs considerably dried in, air-space abnormally large, showing the 'white' very limpid and quite discoloured; very musty odour. The majority of the eggs were considered as decidedly bad and unfit for use.

Sodium aluminate, 5 per cent solution.—'White,' slightly tinged; general appearance, good; faint musty odour.

CONCLUSIONS.

The preservative solutions that gave the best results were lime-water and the lime-water containing 1 per cent salt. There was not much difference between the eggs, cooked or uncooked, to sight, smell or taste, kept in these two solutions, but such as there was, we considered, showed the eggs in the latter to be slightly the better.

The addition of salt to the lime-water to an extent exceeding 1 per cent would appear to be no advantage; indeed, when the salt present amounted to 2 per cent we noticed that the quality of the preserved eggs had suffered. The 1 per cent solution is prepared by dissolving $1\frac{1}{3}$ ounces of common salt in each gallon of the saturated lime-water.

The common salt solutions without lime, both 1 per cent and 2 per cent, caused the eggs to have a more marked and disagreeable odour, especially on cooking. All the eggs in the 2 per cent fluid were unusable.

Vaseline-covered eggs were not quite as well preserved as those simply in lime-water.

The paraffin-covered eggs were decidedly inferior to those simply preserved by lime-water.

The eggs dipped in a solution of permanganate of potash were decidedly bad, showing that the claims for this much vaunted chemical are without foundation.

In summing up the conclusions from the work of 1901, we feel justified in repeating the statement that saturated lime-water is a most effective preservative. We can further say that it is a cheap, easily prepared and pleasant fluid to handle. The addition of a small amount of salt (not exceeding 1 per cent) appears to be an advantage, but a larger amount—even 2 per cent—of salt is decidedly detrimental to the quality of the preserved eggs.

EXPERIMENTAL FARM FOR THE MARITIME PROVINCES

REPORT OF R. ROBERTSON, SUPERINTENDENT.

NAPPAN, N.S., November 30, 1901.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my third annual report, it being the fourteenth annual report of operations on the Experimental Farm for the maritime provinces at Nappan, N.S.

The season was not favourable for the majority of crops, although especially favourable for hay and corn. The early wet spring benefited the hay crop, which was good, especially on the upland.

The early grain was quite promising until toward reaping time, when the continuous warm dry weather caused it to ripen prematurely; the result being that most of the grain was light per bushel, and did not yield nearly as many bushels as was expected. The late sown grain was extremely poor. Roots were a fair crop. The field corn was the best we have ever had. The warm weather was extremely favourable for this crop, which matured well.

The catch of clover was fairly good, but has made nothing like the usual growth.

The after grass was very poor, and as a result all cattle in this section are very much thinner in flesh than they have been at the same period during the last four years.

About the usual number of people visited the farm this year. The largest excursion for the season was from Fox Creek, N.B., on July 20. Many smaller groups or picnics, of from 20 to 100, came from time to time during the summer.

I again wish to acknowledge the valuable services of Mr. Thomas Coates, farm foreman, who kept records of all grain experiments, and took charge of general farm work, and of Mr. Robert Donaldson, herdsman, under whose charge all the experiments with stock were carried on.

WEATHER.

December commenced quite cold, moderating, however, on the 4th, with a drifting snow storm on the 5th. This made very good sleighing, which continued for the winter.

The thermometer registered 3° below zero on the 9th, and continued below zero until the 12th, when 12° below zero was reached. It soon moderated somewhat, and on the 14th we had another snow storm which made good roads.

The thermometer again went below zero on the 16th, and on the 18th 11° below zero was reached.

The month from this time out was not very cold, with the exception of the 28th, when zero was again reached.

The 2nd and 3rd of January, registered 2° and 6° below zero respectively. It kept quite cold and fine until the 12th and 13th, when a heavy drifting snow storm made it necessary to break out roads, which were drifted full in many places. The mercury

fell to zero on the 14th, and 9° below on the 15th, 6° below on the 19th, and 10° below on the 23rd. The weather was again fine until the 25th, when it came in mild, with rain on the 26th and 27th, turning cold again, however, and continuing so until the end of the month.

There was a heavy fall of snow on the 3rd of February, which made road breaking again necessary, and on the 8th another snow storm blocked the roads. With one exception the balance of the month was fine and moderate, but the temperature fell to 3° below zero on the 23rd, followed with moderate weather and a heavy storm on the 24th, which again drifted the roads full of snow.

March started fine but cold, moderating somewhat until the 7th, when the thermometer fell to 10° below zero. It soon moderated again, and on the 9th snow, followed with some rain and wind, which soon took off much snow. The remainder of the month was fairly moderate, taking off the snow gradually; and on the 22nd a heavy warm rain with wind took off most of what remained, and broke up sleighing. The weather continued open, and another rain followed on the 28th.

April opened fine with no very cold weather. It rained on the 5th, and again on the 11th, after which fine dry weather continued. On the 19th some seeding was done, but it set in wet on the 22nd, the weather being broken until the 26th; the balance of the month being fine.

May commenced fine with cold weather on the 2nd, when the last spring frost was recorded of 6°. The 4th was wet, and it continued dull until the 8th, when fine weather was broken by a rain on the 13th. It continued fine again until the 23rd, after which the month was broken and dull. No very great amount of rain fell during this month. but enough to retard seeding operations very much, and while the spring was early, yet the majority of the crops were late sown on account of the continuous dull weather.

June opened dull, but there was very fair weather the greater part of the month, with slight rains on the 2nd, 10th, 13th and 24th. The thermometer registered 81°, 83° and 80° on the 26th, 27th and 29th respectively.

July was exceptionally fine and dry, having only slight showers on the 8th and 15th. The mercury was up to 81°, 80°, 81°, 86°, 85°, 82°, 80° and 82° as the highest on the 12th, 13th, 14th, 15th, 16th, 18th, 22nd and 23rd respectively.

August was fine, with the exception of dull weather and light showers on the 6th, 9th and 10th. The temperature was up to 83°, 80°, 84°, 81°, 80° and 81° on the 1st, 6th, 7th, 24th, 28th and 30th respectively. The summer months were more continuously warm than usual, with no very extreme heat. The dry weather continued through August, affecting the crops very much.

September commenced fine, but dull weather and occasional showers continued after the first week until the 19th, when the first heavy rain of the season fell. This materially helped the crops still growing. The weather continued broken for three days, after which the month was fine. A temperature of 83° and 85° is recorded for the 6th and 7th respectively. This month throughout was unusually warm.

October commenced fine, but broken weather on the 3rd was followed by fine weather until the 18th and 19th, when it was again wet until the 26th. The remainder of the month was fine. The first frost of the season to strike here was on the 8th October, the thermometer registering then 1°, and on the 22nd 10° of frost is recorded. The weather was then moderate until the 28th, when the mercury again fell below freezing.

The first of November was fine, with snow and some rain on the 10th. It kept fine, with occasional frosts until the 25th, when we had a heavy rain and wind storm, followed by cold weather.

METEOROLOGICAL RECORD.

Maximum and minimum thermometrical observations for the year beginning with December 1, 1900, and ending November 30, 1901.

Month.	Maximum.	Minimum.
December, 1900	31st 39° above zero	18th 11° below zero.
January, 1901	23rd and 26th 39° above zero	23rd 10° "
February "	26th 36° above zero	23rd 3° "
March "	26th 45° "	7th 10° "
April "	19th and 28th 64° above zero	3rd 23° above zero.
May "	22nd 75° above zero	2nd 26° "
June "	27th 83° "	16th 35° "
July "	15th 86° "	25th 39° "
August "	7th 84° "	22nd 40° "
September "	7th 85° "	20th 33° "
October "	13th 68° "	22nd and 29th 22° above zero.
November "	1st 62° "	24th 9° above zero.

EXPERIMENTS WITH OATS.

Sixty-four varieties of oats were sown in uniform plots of one-fortieth acre each on May 1. The soil was a clay loam, and was previously in mangels, having been manured for that crop with 30 one-horse cart loads of manure per acre, which was put on in the spring of 1900, and to which 200 pounds of complete fertilizer was added before the rows were run up for the crop. The land was ploughed after the mangel crop was removed in the fall of 1900, and this spring was worked up by going over it twice with the spring-tooth harrow and once with the smoothing harrow. No fertilizer of any kind was used for the grain crop.

The seed was sown at the rate of 2½ bushels per acre with the Wisner seed drill. The field was seeded down to clover and timothy at the rate of 3 pounds of alsike, 7 pounds mammoth red clover and 12 pounds timothy seed per acre. This seed was sown with an attachment to the seeder at the same time the grain was sown. The crop of straw was generally good, and stood up well. It was bright and free from rust. The majority of the plots had some smutty heads in them, but none were badly affected. The results obtained from this test are given in the following table :—

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Cream Egyptian	Aug.	16	107	45	Stiff	7 to 9	Sided	5,200	76	16	40
Cromwell	"	22	113	48	"	6 " 9	"	6,000	74	4	36
Rosedale	"	10	101	46	"	6 " 9	"	5,000	71	26	40
Abyssinia	"	17	108	47	"	6 " 9	"	5,480	68	8	40
American Beauty	"	18	109	45	"	6 " 8	Branching	4,800	68	8	37
Oderbruch	"	16	107	46	Medium	6 " 8	Sided	5,000	68	8	38
White Schonen	"	15	106	44	Stiff	6 " 8	Branching	5,000	68	8	34
Early Golden Prolific	"	10	101	46	"	7 " 9	"	4,400	67	2	35
Flying Scotchman	"	10	101	46	Medium	6 " 9	"	5,000	67	2	40
Black Mesdag	"	6	97	45	Stiff	6 " 8	"	4,600	65	30	34
Black Beauty	"	9	100	44	"	7 " 10	"	5,000	65	30	34
Siberian	"	18	109	44	"	6 " 8	"	4,200	65	30	35
Improved American	"	18	109	48	"	7 " 9	"	4,800	65	30	36
Bavarian	"	18	109	46	"	7 " 9	"	5,080	65	30	37
Lincoln	"	18	109	45	"	6 " 8	"	4,800	64	24	37
Pense	"	16	107	45	"	7 " 9	Sided	4,800	64	24	37
Hazlett's Seizure	"	10	101	46	"	6 " 9	Branching	4,600	63	18	39
Prolific Black Tartarian	"	18	109	46	"	6 " 9	Sided	5,400	63	18	35
Mennonite	"	18	108	45	"	6 " 8	Branching	4,400	63	18	34
White Giant	"	16	107	44	"	6 " 8	"	4,280	63	18	36
Newmarket	"	18	109	45	Medium	7 " 9	"	5,000	63	18	36

OATS—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Banner	Aug. 16..	107	43	Stiff......	6 to 8	Branching..	5,000	63	18	36
Early Blossom	" 16..	107	46	"	6 " 8	Sided.......	5,000	62	12	40
White Russian	" 14..	105	44	Medium.	7 " 9	Branching..	4,600	62	12	37
Abundance	" 16..	107	43	Stiff	7 " 9	" ..	4,600	62	12	35
Joanette	" 10..	101	43	Medium..	6 " 9	" ..	4,500	62	12	35
Buckbee's Illinois	" 18..	109	46	Stiff. ...	6 " 8	" ..	5,000	62	12	37
Early Maine	" 17..	108	45	"	6 " 8	" ..	4,680	62	12	36
Bonanza	" 10.	101	46	"	7 "10	" ..	4,500	61	6	36½
Wallis	" 18..	109	43	"	6 " 8	" ..	4,280	61	6	37
Kendal	" 16..	107	46	"	7 " 9	Sided.......	5,000	61	6	36
Early Archangel	" 8..	99	45	"	7 " 9	Branching..	4,200	60	..	40
Improved Ligowo	" 15..	106	45	"	6 " 8	" ..	4,600	60	..	38
Thousand Dollar	" 16..	107	46	"	6 " 8	" ..	4,600	60	..	38
Golden Beauty	" 18..	109	45	Medium..	6 " 8	" ..	4,200	60	..	36
Milford	" 16..	107	46	Stiff. .. .	6 " 9	Sided.......	4,400	60	..	39
Tartar King	" 10..	101	46	"	7 " 9	"	5,000	60	..	37
Golden Tartarian	" 22..	113	45	"	7 "10	" .. .	4,800	60	..	35
Sensation	" 11..	102	44	"	6 " 9	Branching..	3,800	58	28	36
Early Gothland	" 16..	107	46	"	7 " 9	Sided.......	4,200	58	28	38
California Prolific Black	" 18..	109	47	"	6 " 9	"	5,000	58	28	35
Scotch Potato	" 16..	107	40	"	6 " 8	Branching..	4,200	58	28	38½
Olive	" 16..	107	43	"	7 " 9	Sided.......	4,800	58	28	36
American Triumph	" 22..	113	46	"	6 " 9	Branching..	6,000	58	28	39
Golden Giant	" 22..	113	45	"	6 " 8	Sided.	5,000	57	22	37
Irish Victor	" 15..	106	42	"	7 " 9	Branching..	4,400	57	22	34
Danish Island	" 18..	109	45	"	6 " 8	" ..	4,600	57	22	36
Holstein Prolific	" 15..	106	46	Medium..	6 " 9	" ..	4,200	57	22	37
Pioneer	" 18..	109	44	" ..	6 " 8	" ..	4,200	57	22	38
Wide Awake	" 18..	109	44	Stiff......	6 " 8	" ..	4,200	56	16	38
Salzer's Big 4	" 14..	105	42	"	6 " 8	" ..	4,200	56	16	35
Miller	" 18..	109	43	"	6 " 8	" ..	4,600	56	16	38
Goldfinder	" 18..	109	42	"	6 " 8	Sided.	4,200	55	10	35
Columbus	" 18..	109	43	Medium..	6 " 8	Branching..	3,800	55	10	36
King	" 16..	107	46	Stiff	6 " 8	" ..	4,200	54	4	38
Oxford	" 18..	109	45	Medium .	6 " 8	" ..	4,400	51	26	40
Waverley	" 16..	107	44	Stiff......	6 " 9	" ..	4,280	51	26	38
New Zealand	" 22.	113	46	"	7 " 9	Sided.......	5,000	49	14	37
Brandon	" 18..	109	46	"	6 " 9	Half Sided..	3,800	48	8	38½
Holland	" 18..	109	42	Medium..	6 " 8	" ..	4,200	47	2	38
Master	" 18..	109	45	" ..	6 " 9	Branching..	4,200	47	2	38½
Russell	" 18..	109	46	Stiff	6 " 9	Half Sided .	4,200	47	2	38½
Longhoughton	" 18..	109	42	"	7 " 9	Branching..	3,800	44	24	39
Salines	" 17..	108	46	"	6 " 8	" ..	4,400	44	24	35

EXPERIMENTS WITH BARLEY.

The different varieties of barley were sown May 11. The soil was of a clay loam character, and was previously in corn. It was manured for this crop in the spring of 1900, with 30 one-horse cart loads of stable manure per acre. After the corn crop was removed in the fall of 1900, it was ploughed, and before seeding to grain this spring it was worked up by going over it twice with the springtooth and once with the smoothing harrows.

Thirty varieties of six-rowed and twenty-two varieties of two-rowed sorts were sown. The seed was sown with the Wisner seed drill at the rate of two bushels per acre. The land was also seeded down to timothy and clover at the rate of 3 pounds alsike, 7 pounds mammoth red clover, and 12 pounds timothy per acre. No fertilizers of any sort were used with this grain. The plots were one-fortieth acre each.

The majority of the plots had smut in them, but in every case the injury from this cause was slight. The straw was stiff, and stood up well. It was free from rust. The following results were obtained from these test plots :—

BARLEY, SIX-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush.	Lbs.	Lbs.
Common	August 5.	86	44	Medium	1½ to 2	5,880	64	8	48
Oderbruch	" 7.	88	43	"	1½ " 2½	5,400	61	32	49
Odessa	" 7.	88	44	Stiff	1½ " 2½	5,080	60	..	48
Baxter	" 7.	88	44	"	2 " 3	5,520	59	8	49
Mensury	" 7.	88	42	"	2 " 3	4,000	56	32	48
Claude	" 7.	88	46	"	2 " 2½	5,600	52	24	49
Hulless Black	" 5.	86	34	Medium	2	5,400	50	40	61
Yale	" 12.	93	44	"	2	4,800	50	40	47
Albert	" 5.	86	40	Stiff	2 " 3	4,600	50	..	49
Excelsior	" 5.	86	48	Medium	2 " 3	5,080	50	..	40
Success	" 5.	86	41	"	2 " 2½	4,600	49	8	40
Argyle	" 7.	88	43	Stiff	2 " 3	4,400	48	16	48
Champion	" 5.	86	46	Medium	2 " 3	4,400	47	24	37
Vanguard	" 8.	89	44	Stiff	2 " 2½	4,600	47	24	48
Nugent	" 8.	89	41	"	2 " 3	4,000	47	24	48
Hulless White	" 5.	86	36	Medium	2 " 2½	5,000	46	32	59
Petschora	" 7.	88	44	Stiff	2 " 2½	3,600	46	32	47
Empire	" 8.	89	45	Medium	2 " 2½	3,480	46	32	48
Rennie's Improved	" 6.	87	45	Stiff	1½ " 2	3,480	46	32	48
Garfield	" 7.	88	46	"	2 " 2½	4,600	45	40	49½
Brome	" 12.	93	43	Medium	2 " 3	4,000	45	..	48
Pioneer	" 7.	88	43	Stiff	1½ " 2½	4,400	44	8	49
Phoenix	" 7.	88	43	"	1½ " 2	4,400	42	44	49
Trooper	" 10.	91	40	"	2 " 2½	4,000	41	32	48
Royal	" 8.	89	40	"	2 " 2½	4,000	41	32	47
Summit	" 15.	96	43	"	2 " 2½	4,000	40	40	49
Surprise	" 15.	96	42	"	2 " 2½	4,000	40	..	48
Mansfield	" 12.	93	42	"	2 " 2½	3,600	40	..	46
Stella	" 15.	96	42	"	2 " 2½	3,400	38	16	49
Blue Long Head	" 8.	89	40	"	2 " 3	4,000	38	16	43

BARLEY, TWO-ROWED—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Inches.	Lbs.	Bush.	Lbs.	Lbs.
Beaver	Aug. 10..	91	40	Medium	2 to 4	5,800	56	32	50
French Chevalier	" 14..	95	42	"	2 " 4	5,000	52	24	50
Bolton	" 10..	91	41	Stiff	2 " 3	4,800	45	..	50
Newton	" 15.	96	41	"	2 " 3	4,080	45	..	50
Standwell	" 15..	96	42	Medium	2 " 3	3,600	45	..	48
Canadian Thorpe	" 15..	96	42	Stiff	2 " 3	5,200	44	8	49
Prize Prolific	" 14..	95	36	"	2 " 3½	4,000	42	24	49
Kirby	" 8..	89	43	"	2 " 3	4,200	40	40	49
Leslie	" 15..	96	42	"	2 " 3	4,600	39	8	48
Sidney	" 15..	96	41	"	2 " 3	3,800	38	16	50
Danish Chevalier	" 15..	96	38	Medium	3 " 4	3,200	38	16	49
Nepean	" 15..	96	44	Stiff	2 " 3	4,600	37	24	49
Harvey	" 15..	96	42	"	2 " 3	4,400	36	32	49½
Gordon	" 14.	95	46	"	2 " 3	4,800	56	32	48
Invincible	" 14..	95	38	"	2 " 3	4,600	35	40	49
Logan	" 15..	96	46	"	2 " 3	3,880	35	40	49
Kinver Chevalier	" 15..	96	33	Medium	3 " 4	3,000	33	16	49
Clifford	" 14.	95	42	Stiff	2 " 3	3,200	33	16	50
Victor	" 15..	96	42	Medium	2 " 3	3,200	30	40	48
Dunham	" 15..	96	43	Stiff	2 " 3	3,800	30	40	48
Fulton	" 15..	96	42	"	2 " 3	3,000	30	..	47
Jarvis	" 14..	95	43	"	3 " 4	3,000	27	24	47

EXPERIMENTS WITH SPRING WHEAT.

The soil on which these experiments were conducted was a clay loam. The previous crop was mangels, and the land received for this crop, 30 one-horse cart loads of manure per acre put on in the spring of 1900, to which was added 200 pounds complete fertilizer per acre. The land was ploughed after the mangel crop was removed, and this spring it was worked up by going over it twice with the springtooth and once with the smoothing harrow.

At the time of seeding 3 pounds alsike, 7 pounds mammoth red clover, and 12 pounds timothy seed per acre was sown with the grain. The seed was sown with the Wisner seed drill, which carries an attachment through which the clover and timothy are sown at the same time. The wheat was sown on April 30, at the rate of 1¾ bushels per acre, and no fertilizer of any kind was used. The size of the plots was one-fortieth of an acre each. The straw was bright and practically free from rust. There was no smut whatever. The straw was stiff and none lodged. The grain filled out well considering the dry season. The results obtained from the seventy-one varieties under test are given in the following table:—

WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Roumanian	Aug. 21	113	46	Stiff	2 to 3	Bearded	5,000	40		61½
Weldon	" 21	113	59	"	2 " 3	Beardless	4,810	35	20	60½
Advance	" 17	109	48	"	2 " 3	Bearded	4,800	35	20	60½
Hastings	" 20	112	44	Medium	2 " 3	Beardless	3,600	34	40	60½
Beaudry	" 21	113	46	"	2 " 3	Bearded	4,200	34	40	60
Crown	" 20	112	52	Stiff	2 " 3	"	4,600	34	40	59
Hungarian	" 19	111	47	Medium	3 " 3½	"	4,400	34	..	60
Colorado	" 18	110	48	Stiff	2 " 3	"	4,200	34	..	61½
White Connell	" 21	113	46	"	2 " 3	Beardless	4,400	34	..	60
Norval	" 20	112	47	"	2 " 3	Bearded	4,600	34	..	61
Clyde	" 20	112	50	"	2 " 3	Beardless	4,480	34	..	59
Admiral	" 20	112	50	"	2 " 3	"	4,800	33	20	60
Preston	" 18	110	50	"	3 " 3½	Bearded	4,480	33	20	61
Vernon	" 18	110	46	"	2 " 3	"	3,800	33	20	61
Alpha	" 20	112	52	"	2 " 3	"	5,400	33	20	60
White Russian	" 21	113	50	"	2 " 3	Beardless	4,800	33	20	60
Red Fern	" 19	111	50	"	2 " 3	Bearded	4,800	32	40	60
Plumper	" 19	111	46	Medium	2 " 3	"	4,000	32	40	61
Japanese	" 20	112	46	Stiff	2 " 3	"	4,120	32	40	58
Blair	" 20	112	44	Medium	2 " 3	"	4,120	32	40	60
Mason	" 20	112	46	Stiff	2 " 3	Beardless	3,880	32	..	61
Herisson Bearded	" 19	111	44	Weak	1½ " 2	Bearded	3,800	32	..	60
Harold	" 19	111	45	Medium	2 " 3	"	3,400	30	40	60
Stanley	" 20	112	46	Stiff	2 " 3	Beardless	3,800	30	40	61
Chester	" 20	112	42	"	2 " 3	"	3,440	30	40	60
Rio Grande	" 19	111	50	"	2½ " 4	Bearded	3,720	30	40	60
Monarch	" 21	113	48	"	2 " 3	Beardless	4,280	30	40	60
Byron	" 21	113	42	"	2 " 3	"	4,000	30	..	61
Percy	" 19	111	50	"	2 " 3	"	4,000	30	..	60
Pringle's Champlain	" 18	110	47	Medium	2 " 3	Bearded	3,400	30	..	60
Laurel	" 21	113	48	Stiff	2 " 3½	Beardless	4,120	30	..	59
Campbell's White Chaff	" 18	110	48	"	2 " 3	"	4,800	30	..	61
Red Swedish	" 18	110	48	"	2 " 3½	Bearded	3,8 0	30	..	61
White Fife	" 21	113	48	"	2 " 3	Beardless	4,200	30	..	60
Minnesota No. 163	" 21	113	46	"	2 " 3	Beardless	4,680	30	..	60
" No. 181	" 21	113	47	"	2 " 3	"	4,800	29	20	60
Wellman's Fife	" 21	113	50	"	2 " 3½	"	4,360	28	40	59
Blenheim	" 19	111	50	"	2 " 3½	Bearded	3,720	28	40	59

WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Rideau	Aug. 20..	112	46	Stiff	2 to 3	Beardless	4,400	28	40	59
Countess	" 21..	113	47	"	2 " 3	"	3,600	28	40	60
Speltz	" 21..	113	36	Weak	2 " 2¼	Bearded	2,800	28	..	41
Red Fife	" 19..	111	47	Stiff	2 " 3	Beardless	3,400	27	20	60
Australian No. 10	" 26..	118	46	"	2 " 3	"	4,680	27	20	59½
Early Riga	" 15..	107	42	"	2 " 3	"	3,200	26	40	60
Ladoga	" 16..	108	45	"	2 " 3	Bearded	3,800	26	40	60½
Crawford	" 20..	112	45	"	2 " 3	Beardless	3,600	26	40	60
Ebert	" 20..	112	45	"	2 " 3	"	3,600	26	40	60
Fraser	" 19..	111	46	"	2 " 3	Bearded	3,400	26	40	59
Dion's	" 19..	111	48	"	2 " 3	"	3,400	26	40	61
Australian No. 25	" 26..	118	46	"	2 " 3	Beardless	3,580	26	40	59
Dawn	" 19..	111	47	"	2 " 3	"	3,400	26	40	60
Bishop	" 21..	113	46	"	2 " 3	"	3,400	26	..	61
Cassel	" 21..	113	45	"	2 " 2½	"	3,320	26	..	59½
Goose	" 20..	112	47	Medium	2 " 2½	Bearded	3,500	26	..	61½
Progress	" 20..	112	47	Stiff	2 " 3	Beardless	3,400	25	20	60
Huron	" 19..	111	48	"	2 " 2½	Bearded	3,800	25	20	60
Dufferin	" 19..	111	46	"	2 " 3	"	3,400	24	40	60
Angus	" 20..	112	48	"	2 " 3	Beardless	3,400	24	40	60
Cartier	" 20..	112	42	"	2 " 2½	Bearded	2,800	24	40	59½
Beauty	" 19..	111	48	Medium	2 " 2½	Beardless	2,920	24	40	59
Essex	" 21..	113	46	Stiff	2 " 3½	"	2,580	24	40	58½
Australian No. 27	" 26..	118	46	"	2 " 3	"	3,200	24	40	59
" No. 13	" 26..	118	46	"	2 " 3	"	3,400	24	..	59½
Captor	" 21..	113	38	"	2 " 2½	"	3,400	23	20	59
Minnesota No. 169	" 21..	113	46	"	2 " 3	"	3,400	22	40	59
Australian No. 23	" 26..	118	46	"	2 " 3	"	3,000	22	40	59½
Minnesota No. 149	" 21..	113	44	"	2 " 3	"	3,400	22	..	59
Robin's Rust Proof	" 21..	113	46	"	2 " 3½	"	4,400	20	40	60
Australian No. 9	" 26..	118	44	"	2 " 3	"	3,400	20	..	59
" No. 19	" 26..	118	45	"	2 " 3	"	3,080	20	..	59½
Benton	" 21..	113	45	"	2 " 3	"	2,920	20	..	58½

EXPERIMENTS WITH PEASE.

Fifty-seven varieties of pease were sown on one-fortieth acre plots on May 2. The previous crop grown on this land was turnips, which received 18 one-horse cart loads of stable manure, and 200 pounds complete fertilizer per acre. The land was ploughed after the turnip crop was taken off, and this spring was worked up by going over it twice with the springtooth and once with the smoothing harrow.

The soil was a clay loam. No fertilizer was used for this crop. Timothy and clover seed at the rate of 3 pounds alsike, 7 pounds mammoth red clover ,and 12 pounds timothy per acre was sown with the grain.

The pea aphis was not troublesome this season, and has apparently disappeared. The results obtained from these tests are as follows:—

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				In.	Lbs.	In.		Bush.	Lbs.	Lbs.
Arthur	Aug. 22	112	Strong	48	5,400	2 to 2½	Medium	50	..	62
Pearl	" 31	121	"	36	5,200	2 " 2½	"	50	..	61
Gregory	" 28	118	"	50	5,600	2 " 3	"	48	40	61½
Victoria	" 29	119	"	48	5,600	2 " 3	Large	48	40	60
Pride	" 28	118	"	50	5,400	2 " 3	Medium	46	40	61
Elder	" 31	121	"	45	5,400	2 " 3	"	46	40	61
Bright	" 28	118	"	48	5,200	2 " 3	Large	46	40	62
Chancellor	" 17	107	"	48	5,000	1½ " 2	Small	45	20	62
Fergus	" 31	121	"	46	5,600	2 " 3	Medium	45	20	62
Elliot	" 28	118	"	48	5,600	1½ " 2	"	44	40	60
Agnes	" 28	118	"	50	5,480	2 " 3	"	44	40	62
Crown	" 25	115	"	43	4,000	1 " 2	Small	44	..	62
Paragon	" 18	108	Weak	30	3,600	1 " 2	Medium	43	20	62
Oddfellow	" 28	118	Strong	46	4,600	1 " 2	"	43	20	62
Large White Marrowfat	" 28	118	"	53	4,800	3 " 3½	Large	43	20	62½
Prince Albert	" 27	117	"	46	5,200	2 " 3	Medium	43	20	61
Multiplier	" 28	118	"	48	5,600	2 " 3	"	43	20	62
Herald	" 30	120	"	48	5,000	2 " 2½	"	42	40	62
Bruce	" 28	118	"	48	5,400	2 " 3	Large	42	40	61½
Duke	" 23	113	"	50	5,000	1½ " 2	Medium	42	40	61
Dover	" 29	119	"	50	5,000	2 " 3	Large	42	40	63
Kent	" 31	121	"	50	4,400	2 " 3	"	42	40	61
Wisconsin Blue	" 28	118	"	44	4,200	2 " 3	Medium	42	40	62
Macoun	" 28	118	"	48	4,000	2 " 3	"	42	40	63
Nelson	" 18	108	"	46	4,400	2 " 3	"	42	40	63
Archer	" 23	113	"	50	4,400	2 " 2½	"	42	..	63
Picton	" 29	119	"	46	4,800	2 " 3	"	42	..	62
Mackay	" 29	119	"	48	5,000	2 " 3½	Large	42	..	61
Chelsea	" 31	121	"	48	5,600	2 " 3	"	42	..	61
New Potter	" 27	117	"	50	5,600	2 " 3	"	42	..	61½
White Wonder	" 17	107	"	35	4,000	2 " 3	Medium	41	20	62
Cooper	" 23	113	"	48	4,600	2 " 2½	"	41	20	63
King	" 23	113	"	48	4,200	2 " 3	"	41	20	61½
Prussian Blue	" 18	108	"	46	5,000	2 " 2½	"	40	40	63
French Canner	" 28	118	"	48	5,000	2½ " 3	"	40	40	62
Early Britain	" 17	107	"	50	4,600	1½ " 2	Large	40	40	61
Perth	" 21	111	"	48	4,200	2 " 2½	"	40	40	62
Elephant Blue	" 18	108	"	50	4,800	2 " 3	Medium	40	40	62
Golden Vine	" 23	113	"	46	3,800	1 " 2	Small	40	40	62½
German White	" 23	113	"	52	4,400	2 " 2½	Medium	40	40	63
Lanark	" 29	119	"	54	4,400	2 " 3	Large	40	40	61
Creeper	" 17	107	"	50	4,200	2 " 2½	Small	38	40	63
Daniel O'Rourke	" 25	115	"	48	3,720	2 " 2½	Medium	38	40	63
Prince	" 18	108	"	43	4,200	1½ " 2	"	38	40	62
Harrison's Glory	" 18	108	"	41	3,800	2 " 3	"	38	..	62½
Black-eyed Marrowfat	" 27	117	"	50	4,600	2 " 3	Large	38	..	62
Trilby	" 29	119	"	49	4,600	2 " 3	"	37	20	61½
Mummy	" 27	117	"	50	4,580	2 " 3	Medium	36	40	62½
Alma	" 18	108	"	48	4,200	2 " 2½	"	36	40	62
Carleton	" 28	118	"	40	3,600	1½ " 2	Small	36	40	62½
Fenton	" 28	118	"	42	4,000	2 " 2½	Medium	36	40	61
English Grey	" 30	120	"	50	4,200	2 " 3	"	36	40	61
Centennial	" 23	113	"	51	3,800	2 " 2½	"	35	20	63
Vincent	" 29	119	"	46	3,880	2 " 3	"	35	20	61
Canadian Beauty	" 22	112	"	50	4,600	2 " 3	Large	33	20	62
Bedford	" 28	118	"	48	3,400	2 " 3	Medium	25	20	63
Grass Pea	" 31	121	Small	36	3,800	1 " 2	Small	22	..	63

EXPERIMENTS WITH BUCKWHEAT.

Five varieties of buckwheat were under test. These plots were one-fortieth acre each. The land was a clay loam in a very poor state of fertility. The previous crops were grown without stable manure. The land was ploughed in the spring, and worked up twice with the springtooth and once with the smoothing harrow. The seed was sown June 6 with the Wisner seed drill and complete fertilizer at the rate of 100 pounds per acre was drilled in with the seed. The crop was harvested August 30. The warm dry weather seemed to cause this crop to shrink very much, much of the seed not being filled. The following yields per acre were obtained:—

BUCKWHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				Inches.		Lbs.	Bush.	Lbs.	Lbs.
Silver-hull	June 6th	Aug. 30	86	36	Stiff.	4,000	16	40	50
Tartarian, or Siberian	"	"	86	37	"	2,280	14	..	48
Grey	"	"	86	35	"	3,400	13	20	48
Rye Buckwheat	"	"	86	39	"	2,600	13	20	49
Japanese	"	"	86	36	"	2,920	12	..	45

EXPERIMENTS WITH FIELD GRAIN.

Six plots of grain of one-half acre each were grown to further test the value of different varieties in field trials. Five of these plots were sown with different sorts of oats, and one with mixed grain made up as follows:—Oats, 2 bushels; barley, 1 bushel; pease, 1 peck, mixed and sown at the rate of 3 bushels per acre.

The land was a light loam, having corn as a previous crop. It was manured for the corn crop in the spring of 1900, with 25 one-horse cart loads of stable manure per acre, and after the corn crop was removed the land was ploughed. This was worked up in the spring time with the springtooth and once with the smoothing harrow. The seed was sown May 10, at the rate of 3 bushels per acre. It was harvested August 14. The following yields were obtained:—

Varieties.	Yield per Acre.	
	Bush.	Lbs.
Rosedale	54	10
White Schonen	49	10
Cream Egyptian	49	4
Black Tartarian	43	28
Sensation	42	12
Mixed Grain	51	31

FIELD CROP OF OATS ON MARSH.

Twelve acres of marsh were ploughed in the fall of 1900. It was worked up in the spring by going over it twice with the spade harrow; twice with the springtooth, and

once with the smoothing harrow. The seed was sown broadcast by hand at the rate of 3½ bushels per acre. The grain was sown and harrowed in with the springtooth harrow, after which clover and timothy, at the rate of 3 pounds alsike, 7 pounds mammoth red clover, and 12 pounds timothy seed per acre were sown and worked up by going over it once with the smoothing harrow. No fertilizer of any kind was used. Eight acres of this were sown May 20, and yielded at the rate of 35 bushels per acre.

Another four acres were low, wet marsh, which made it difficult to work, and seeding was not done on it until June 5. The land was worked in a manner similar to the other marsh and seeded at the same rate. The yield from this was at the rate of 20 bushels per acre.

Owing to the dry season the straw was very short, and the yield very light. That grown on the low, wet land was also badly injured with rust.

FIELD CROPS OF MIXED GRAIN ON UPLAND.

The grain used in this field was made up as follows:—Oats, 2 bushels; barley, 1 bushel; pease, 1 peck. mixed together and sown at the rate of three bushels per acre. The seed was sown May 11 and harvested August 17.

The soil was a light clay loam. The previous crop was turnips, and the land received for this crop, 18 one-horse cart loads of manure and 200 pounds complete fertilizer per acre. No fertilizer of any kind was used with the grain crop. The yield per acre was 50 bushels.

FIELD CROP OF BUCKWHEAT.

Ten acres of buckwheat was grown on land which was in a poor state of fertility. The previous crop was buckwheat, seeded to clover. The clover made a very poor growth. The land was ploughed in the spring, and worked up with the disc, springtooth and smoothing harrows. It was seeded to silver-hull buckwheat, June 20, at the rate of 1 bushel per acre. Owing to the hot dry weather the crop blighted, and did not fill out well.

The yield from this field was 126 bushels.

Five acres of land, which was also in a poor state of fertility, having previously a crop of buckwheat, seeded down with clover, was sown June 20 to silver-hull buckwheat at the rate of 1 bushel per acre, and Albert Thomas Phosphate at the rate of 200 pounds per acre was sown with the seed by means of the fertilizer attachment on the seeder. The yield from this field was 84 bushels. This field did not blight nearly so badly as the 10 acres, due possibly to being later sown, and the blossoming period escaping the hot weather.

EXPERIMENTS WITH INDIAN CORN.

The soil on which the corn plots were laid out was a clay loam. The previous crop was timothy. The land was manured in the fall of 1900 on the sod, with 20 one-horse cart loads of barn-yard manure per acre. This manure together with a good crop of grass was ploughed under June 1, 1901. The land was worked with the disc harrow once, and once with the smoothing harrow. Marks were made 3 feet apart, and the seed dropped in the rows, after which it was covered with the hoe by hand. Duplicate plots were also sown in hills 3 feet apart.

The seed was sown June 3, and the crop was harvested September 27. No chemical fertilizers were used on these plots. The yield per acre is estimated from the crop obtained from two rows, each 66 feet long. Thirty-four varieties were included in the test, and the following results were obtained:—

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Height.	Leafiness.	When Tasseled	In Silk.	Condition when cut, Sept. 27.	Weight per acre grown in rows.	Weight per acre grown in hills.
	In.					Tons. lbs.	Tons. lbs.
Early Mastodon	83	Medium..	Aug. 25	Sept. 1	Milk	20 150	19 500
Cloud's Early Yellow	84	"	" 28	" 5	Watery	19 1,600	17 100
Mammoth Cuban	98	"	" 31	" 10	Silk	17 650	17 650
Champion White Pearl	84	"	" 22	" 3	Late milk	17 320	14 1,150
Selected Leaming	84	"	" 22	" 3	"	17 100	14 1,700
Early Butler	73	"	" 22	" 3	"	16 1,220	14 1,700
Early Yellow Long Eared	66	"	" 19	Aug. 30	Soft glazed..	16 1,000	15 800
Pride of the North	92	"	" 25	Sept. 1	Milk	15 1,900	17 650
Longfellow	75	Very..	" 17	Aug. 28	Soft glazed..	15 250	12 1,520
Red Cob Ensilage	100	Medium..	Sept. 20	" 28	Tasseled	14 1,700	14 1,700
Rural Thoroughbred White Flint	86	"	" 20	Sept. 25	Silk	14 1,700	15 250
Giant Prolific Ensilage	90	"	" 28	" 10	Early milk..	14 1,370	15 1,570
Extra Early Huron Dent	96	"	" 22	" 3	"	14 1,370	11 1,650
Angel of Midnight	73	Very	" 17	Aug. 28	Soft glazed..	14 1,370	11 1,650
Sanford	74	"	" 19	Sept. 1	Late milk..	14 270	13 950
King of the Earliest	72	Medium..	" 19	" 15	Watery	14 50	13 1,500
Salzer's All Gold	72	"	" 23	" 15	Late milk..	14 50	14 1,700
Compton's Early	75	Very	" 15	Aug. 26	Soft glazed..	14 50	13 950
Ruby Mexican	85	"	" 26	Sept. 7	Milk	13 1,720	13 400
Evergreen Sugar	78	Medium..	" 25	" 7	"	13 1,500	13 1,500
North Dakota Yellow	72	Very	" 17	Aug. 25	Glazed	13 950	14 1,600
Kendall's Early Giant	86	Medium	Aug. 15	" 30	Soft glazed..	13 950	14 600
Salzer's Superior Fodder	84	"	" 15	" 30	Silk	13 620	15 250
Mammoth Eight-rowed Flint	90	"	" 19	Sept. 1	Early milk.	13 620	15 250
White Cap Yellow Dent	98	"	" 20	" 1	"	13 400	15 1,900
Canada White Flint	72	"	" 19	Aug. 30	Soft glazed..	13 400	14 600
Country Gentleman	75	Very	" 19	" 30	"	12 1,850	13 400
North Dakota White	73	Medium..	" 19	" 30	Early milk..	12 750	11 1,650
Pearce's Prolific	72	Very	" 17	" 26	Glazed	12 750	11 1,650
Salzer's Earliest Ripe	56	"	" 17	" 26	"	10 900	10 900
Yellow Six Weeks	60	"	" 1	" 15	Hard glazed	10 550	9 1,800
Early August	60	"	" 1	" 15	"	9 1,800	9 150
Mitchell's Extra Early	60	"	" 1	" 15	"	9 370	8 500
Extra Early Szekely	60	"	" 1	" 15	"	8 1,600	9 150

CORN SOWN IN ROWS AT DIFFERENT DISTANCES.

Similar experiments to those conducted last year were made with Indian corn to gain information as to the distances apart the rows should be planted to give the largest yield per acre. Champion White Pearl, Longfellow and Selected Leaming were the varieties used.

The land on which this corn was planted was a clay loam in a good state of fertility. The previous crop was clover, the aftermath of which was ploughed under in the fall of 1900. This ground was disc-harrowed in the spring, and stable manure at the rate of 20 one-horse cart loads per acre was spread broadcast and ploughed under. The ground was worked up with the disc, springtooth and smoothing harrows, after which the seed was sown with the seed drill in rows 21, 28, 35 and 42 inches apart. The seed was sown June 8, and the crop harvested October 1. The plots were one-fortieth acre each, and from the crop obtained from these plots the following yields per acre have been calculated.

CORN AT DIFFERENT DISTANCES APART.

Name of Variety.	Distances between rows.	Yield per acre.	
	Inches.	Tons	lbs.
Selected Leaming	21	22	1,450
"	28	24	1,000
"	35	21	625
"	42	18	225
Longfellow	21	18	900
"	28	20	600
"	35	18	575
"	42	18	900
Champion White Pearl	21	18	...
"	28	21	1,750
"	35	18	1,510
"	42	18	1,125

It will be seen that in each of these trials, the corn planted 28 inches apart gave the heaviest crop.

EXPERIMENTS WITH TURNIPS.

The soil of these plots was a clay loam in a good state of fertility. The previous crop was clover, the aftermath of which was ploughed under in the fall of 1900. In the spring this was worked up with the spade harrow, and 20 one-horse cart loads of stable manure per acre was spread broadcast and ploughed under. This was then gone over with the springtooth and once with the disc harrow, and once with the smoothing harrow. Two hundred pounds of complete fertilizer per acre was sown broadcast and harrowed in with the smoothing harrow. The land was then run up into drills 24 inches apart. The rows were raked off by hand, and marks made along the top of the rows into which the seed was dropped and lightly covered.

The first series of plots was sown May 27, and duplicate ones two weeks later, June 10. The roots were all pulled October 30, and the following yields per acre were calculated from two rows, each 66 feet long. Twenty-nine varieties were included in this test. The turnip plots were somewhat infested with the turnip aphis (*Aphis brassicae*) toward the latter part of the season.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	1st plot sown.	2nd plot sown.	1st plot pulled.	2nd plot pulled.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot.		Yield per acre. 2nd plot.	
					Tons	lbs.	Bush.	lbs.	Tons	lbs.	Bush.	lbs.
Hartley's Bronze	May 27.	June 10.	Oct. 30.	Oct. 30.	44	1,100	1,485	..	28	925	948	45
Carter's Elephant	″ 27.	″ 10.	″ 30.	″ 30.	42	150	1,402	30	23	200	770	..
New Arctic	″ 27.	″ 10.	″ 30.	″ 30.	41	500	1,375	..	32	350	1,072	30
Imperial Swede	″ 27.	″ 10.	″ 30.	″ 30.	40	850	1,347	30	25	325	838	45
Perfection Swede	″ 27.	″ 10.	″ 30.	″ 30.	37	1,900	1,265	..	30	1,875	1 031	15
Mammoth Clyde	″ 27.	″ 10.	″ 30.	″ 30.	37	1,075	1,251	15	24	1,500	825	..
Jumbo	″ 27.	″ 10.	″ 30.	″ 30.	37	250	1,237	30	26	800	880	..
Selected Champion	″ 27.	″ 10.	″ 30.	″ 30.	36	1,425	1,223	45	30	225	1,003	45
Bangholm Selected	″ 27.	″ 10.	″ 30.	″ 30.	35	950	1,183	30	24	1,500	825	..
Giant King	″ 27.	″ 10.	″ 30.	″ 30.	35	950	1,183	30	22	550	742	30
Prize Purple Top	″ 27.	″ 10.	″ 30.	″ 30.	34	475	1,141	15	28	1,750	962	30
Selected Purple Top	″ 27.	″ 10.	″ 30.	″ 30.	34	475	1,141	15	24	1,500	825	30
Halewood's Bronze Top ..	″ 27.	″ 10.	″ 30.	″ 30.	33	1,650	1,127	30	26	890	880	..
Kangaroo	″ 27.	″ 10.	″ 30.	″ 30.	33	1,650	1,127	30	24	1,500	825	..
Marquis of Lorne	″ 27.	″ 10.	″ 30.	″ 30.	33	1,650	1,127	30	25	1,975	866	15
Monarch	″ 27.	″ 10.	″ 30.	″ 30.	33	1,650	1,127	30	24	675	811	15
Shamrock Purple Top	″ 27.	″ 10.	″ 30.	″ 50.	33	1,650	1,127	30	28	1,758	962	30
Webb's New Renown. ..	″ 27.	″ 10.	″ 30.	″ 30.	33	....	1,100	..	26	1,625	893	45
Hall's Westbury	″ 27.	″ 10.	″ 30.	″ 30.	31	1,525	1,058	45	25	1,150	852	30
East Lothian	″ 27.	″ 10.	″ 30.	″ 30.	31	700	1,045	..	22	1,375	756	15
Emperor Swede	″ 27.	″ 10.	″ 30.	″ 30.	31	700	1,045	..	29	1,400	990	..
West Norfolk Red Top ..	″ 27.	″ 10.	″ 30.	″ 30.	30	1,875	1,031	15	29	1,400	990	..
Elephant's Master.	″ 27.	″ 10.	″ 30.	″ 30.	30	1,875	1,031	15	20	1,250	687	30
Skirvings	″ 27.	″ 10.	″ 30.	″ 30.	30	225	1,003	45	22	1,375	756	15
Drummond Purple Top ..	″ 27.	″ 10.	″ 30.	″ 30.	29	1,400	990	..	26	1,625	893	45
Champion Purple Top	″ 27.	″ 10.	″ 30.	″ 30.	28	1,750	962	30	18	1,125	618	45
Magnum Bonum	″ 27.	″ 10.	″ 30.	″ 30.	28	1,750	962	30	19	1,600	660	..
Sutton's Champion	″ 27.	″ 10.	″ 30.	″ 30.	28	1,750	962	30	21	75	701	15
Prize Winner	″ 27.	″ 10.	″ 30.	″ 30.	28	700	935	..	20	1,250	687	30

EXPERIMENTS WITH MANGELS.

Twenty-five varieties of mangels were sown May 27, and duplicate plots two weeks later, June 10. The land on which these were grown was previously in clover, the aftermath of which was ploughed under in the fall of 1900. This land was a clay loam and was in a good state of fertility. Twenty one-horse cart loads of stable manure was applied broadcast this spring, after the ground had been gone over once with the disc harrow. The manure was then ploughed under, and after the springtooth harrow had gone over it the disc was again used. The smoothing harrow was also run over it, after which complete fertilizer at the rate of 200 pounds per acre was sown broadcast, and worked in with the smoothing harrow. The land was then run into drills 24 inches apart. The rows were raked off and the seed sown in holes one foot apart, made with a marker, and from three to six seeds dropped in a place. These were covered by hand with a garden rake.

The plants came up very irregularly, particularly this was the case with the first sown plots. This may have been the fault of the seed to some extent, but more likely on account of the cold wet weather, which continued for some time after they were sown.

The roots from both series of plots were pulled October 30, and the following yield per acre was calculated from two rows, each 66 feet long.

MANGELS—TEST OF VARIETIES.

Name of Variety.	1st plot sown.	2nd plot sown.	1st plot pulled.	2nd plot pulled.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot.		Yield per acre. 2nd plot.	
					Tons	lbs.	Bush.	lbs.	Tons	lbs.	Bush.	lbs.
Gate Post	May 27.	June 10.	Oct. 17.	Oct. 17.	39	1,200	1,320	..	32	1,175	1,086	15
Golden Fleshed Tankard	" 27.	" 10.	" 17.	" 17.	37	1,075	1,251	15	28	100	935	..
Half Long Sugar Rosy	" 27.	" 10.	" 17.	" 17.	35	1,775	1,196	15	30	225	1,003	45
Giant Yellow Globe	" 27.	" 10.	" 17.	" 17.	35	620	1,177	..	33	..	1,100	..
Half Long Sugar White	" 27.	" 10.	" 17.	" 17.	35	125	1,168	45	31	700	1,045	..
Warden Orange Globe	" 27.	" 10.	" 17.	" 17.	34	1,795	1,163	15	31	205	1,036	45
Canadian Giant	" 27.	" 10.	" 17.	" 17.	34	1,300	1,155	..	31	700	1,045	..
Red Fleshed Tankard	" 27.	" 10.	" 17.	" 17.	33	1,650	1,127	30	25	1,975	866	15
Mammoth Yellow Intermediate	" 27.	" 10.	" 17.	" 17.	33	....	1,100	..	37	250	1,237	30
Champion Yellow Globe	" 27.	" 10.	" 17.	" 17.	32	1,340	1,089	..	31	1,525	1,058	45
Norbiton Giant	" 27.	" 10.	" 17.	" 17.	32	350	1,072	30	32	1,175	1,086	15
Mammoth Oval Shaped	" 27.	" 10.	" 17.	" 17.	31	1,525	1,058	45	31	1,195	1,053	15
Ward's Large Oval Shaped	" 27.	" 10.	" 17.	" 17.	31	700	1,045	..	35	125	1,168	45
Yellow Intermediate	" 27.	" 10.	" 17.	" 17.	30	1,875	1,031	15	31	700	1,045	..
Lion Yellow Intermediate	" 27.	" 10.	" 17.	" 17.	29	1,895	998	15	33	825	1,113	45
Prize Mamm. Long Red	" 27.	" 10.	" 17.	" 17.	29	1,895	998	15	29	575	976	15
Leviathan Long Red	" 27.	" 10.	" 17.	" 17.	29	400	990	..	30	1,875	1,031	15
Giant Yellow Half Long	" 27.	" 10.	" 17.	" 17.	29	400	990	..	30	1,875	1,031	15
Gate Post Yellow	" 27.	" 10.	" 17.	" 17.	29	400	990	..	31	205	1,036	45
Mammoth Long Red	" 27.	" 10.	" 17.	" 17.	28	1,750	962	30	28	925	948	45
Yellow Fleshed Tankard	" 27.	" 10.	" 17.	" 17.	28	1,750	962	30	36	1,755	1,229	15
Selected Mammoth Long Red	" 27.	" 10.	" 17.	" 17.	28	760	946	..	28	100	935	..
Giant Yellow Intermediate	" 27.	" 10.	" 17.	" 17.	27	1,440	924	..	31	1,525	1,058	45
Prize Winner Yellow Globe	" 27.	" 10.	" 17.	" 17.	27	1,275	921	15	27	1,275	921	15
Triumph Yellow Globe	" 27.	" 10.	" 17.	" 17.	25	325	838	45	31	1,525	1,058	45

EXPERIMENTS WITH CARROTS.

The experiments with carrots were conducted on land which was clay loam in a good state of fertility. The land previously was in clover, the aftermath of which was ploughed under in the fall of 1900. Stable manure at the rate of 20 one-horse cart loads per acre was spread broadcast in the spring of 1901, after the ground had been once worked with the disc harrow. The manure was ploughed under, and the land harrowed once with the spring-tooth harrow. The disc harrow was again used, after which the smoothing harrow went over the ground. Complete fertilizer at the rate of 200 pounds per acre was sown broadcast, and harrowed in with the smoothing harrow. The land was then run into drills 24 inches apart.

The rows were raked off by hand, and marks made along the top of the rows into which the seed was sown and covered with the garden rake. Twenty varieties of carrots were grown, and the yield per acre was calculated from two rows, each 66 feet long. The seed was sown May 27, and duplicate plots were sown two weeks later, June 10. The crop was harvested October 30, and the following particulars obtained:—

CARROTS—TEST OF VARIETIES.

Name of Variety.	1st plot sown.	2nd plot sown.	1st plot pulled.	2nd plot pulled.	Yield per acre. 1st plot.		Yield per acre. 1st plot.		Yield per acre. 2nd plot.		Yield per acre. 2nd plot.	
					Tons.	lbs.	Bush.	lbs.	Tons.	lbs.	Bush.	lbs.
Giant White Vosges......	May 27	June 10	Oct. 30	Oct. 30	31	700	1,045	..	21	900	715	..
Ontario Champion.......	"	"	"	"	30	1,050	1,017	30	21	1,725	728	45
Mammoth White Intermediate.....	"	"	"	"	29	1,400	990	..	17	1,475	591	15
White Belgian..... .. .	"	"	"	"	29	1,400	990	..	19	1,600	660	..
New White Intermediate.	"	"	"	"	28	100	935	..	21	900	715	..
Improved Short White ..	"	"	"	"	27	450	907	30	19	775	646	15
Green Top White Orthe..	"	"	"	"	26	1,295	888	15	21	900	715	..
Guerande or Ox-heart ...	"	"	"	"	26	800	880	..	17	650	577	30
Yellow Intermediate	"	"	"	"	24	1,500	825	..	20	1,250	687	30
Early Gem........	"	"	"	"	24	1,005	816	45	16	1,825	563	45
Long Yellow Stump Rooted...............	"	"	"	"	24	675	811	15	19	775	646	15
Half Long Chantenay....	"	"	"	"	23	1,025	783	45	19	1,600	660	..
Iverson's Champion.....	"	"	"	"	21	1,725	728	45	20	1,250	687	30
Half Long White..... ..	"	"	"	"	21	1,725	728	45	20	425	673	45
Long Scarlet Altringham.	"	"	"	"	20	425	673	45	18	525	608	45
Carter's Orange Giant....	"	"	"	"	19	775	646	15	18	525	608	45
Scarlet Intermediate.....	"	"	"	"	19	775	646	15	16	1,825	563	45
Scarlet Nantés	"	"	"	"	18	300	605	..	11	1,925	398	45
Long Orange or Surrey...	"	"	"	"	17	1,475	591	15	16	175	536	15
White Vosges, Large Short	"	"	"	"	17	1,475	591	15	14	1,700	495	..

EXPERIMENTS WITH SUGAR BEETS.

Seven varieties of sugar beets were sown May 27, and duplicate plots two weeks later, June 10. The yield per acre was calculated from the crop obtained from two rows, each 66 feet long. The crop was pulled October 17.

The soil was in a good state of fertility, and was previously in clover, the aftermath having been ploughed under in the fall of 1900. In the spring this was worked up with the disc harrow, and 20 one-horse cart loads of stable manure applied per acre. The land was then ploughed, and harrowed with the disc harrow. The smoothing harrow was next used, after which 200 pounds of complete fertilizer per acre was sown and worked in with the smoothing harrow. The rows were run 24 inches apart, and the seed sown in holes one foot apart, made with a marker and from 3 to 6 seeds dropped in a hole. This was covered with a garden rake. The yield per acre obtained was as follows:—

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	1st plot sown.	2nd plot sown.	1st plot pulled.	2nd plot pulled.	Yield per acre 1st plot.		Yield per acre, 1st plot.		Yield per acre, 2nd plot.		Yield per acre. 2nd plot.	
					Tons	lbs.	Bush.	lbs.	Tons	lbs.	Bush.	lbs.
Improved Imperial	May 27	June 10	Oct. 17	Oct. 17	33	..	1,100	..	28	1,750	962	30
Red Top Sugar.......	" 27	" 10	" 17	" 17	27	780	913	..	30	225	1,003	45
Danish Improved........	" 27	" 10	" 17	" 17	25	1,975	866	15	26	1,625	893	45
Royal Giant............	" 27	" 10	" 17	" 17	25	1,645	860	45	26	1,625	893	45
Wanzleben	" 27	" 10	" 17	" 17	25	655	844	15	21	900	715	..
Danish Red Top..... . .	" 27	" 10	" 17	" 17	25	325	838	15	28	1,750	962	30
Vilmorin's Improved.....	" 27	" 10	" 17	" 17	22	1,045	750	45	20	1,250	687	30

EXPERIMENTS WITH POTATOES.

The land on which the potatoes were grown was a clay loam. The previous crop was grain. The land was manured in the fall of 1900 with 30 one-horse cart loads of stable manure per acre, which was spread broadcast and ploughed under in the spring, this was worked up once more with the disc harrow and ploughed, after which it was gone over once each with the spring-tooth, disc and smoothing harrows, and drilled into rows 30 inches apart. No other fertilizers were used in these plots.

The seed was cut, leaving from two to three eyes in each piece, and planted one foot apart in the drills and covered with the plough.

Ninety-two varieties were planted May 17, and dug September 23 and 24. Owing to the dry weather an unusually large crop was not harvested, but they were entirely free from rot. They were sprayed with Bordeaux mixture and Paris green July 20 and August 20, and once with Paris green June 26. The yield per acre has been calculated from two rows, each 66 feet long.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Rose No. 9	418	..	385	..	33	..	Oblong and pink.
Irish Daisy	418	..	365	12	52	48	Round, white.
Canadian Beauty	404	48	360	48	44	..	Oblong, pink and white.
Sabean's Elephant	402	36	365	12	37	24	Oblong, white.
Early Fortune	396	..	369	36	26	24	Long, round, pink.
Late Puritan	385	..	363	..	22	..	Long, white.
Troy Seedling	374	..	301	24	72	36	Round, white.
Holborn Abundance	360	48	325	36	35	12	"
Rural No. 2	360	48	334	24	26	24	"
Seedling No. 7	356	24	330	..	26	24	Oval, pink.
Brown's Rot Proof	356	24	268	24	88	..	"
Clay Rose	352	..	319	..	33	..	Round, pink.
Swiss Snowflake	352	..	319	..	33	..	Round, white.
Cambridge Russet	352	..	312	24	39	36	"
Enormous	352	..	330	..	22	..	Oblong, white.
Rural Blush	349	48	312	24	37	24	Round, pink.
Seattle	345	24	308	..	37	24	Long, white.
Dreer's Standard	345	24	301	24	44	..	Round, white.
Bill Nye	341	..	301	24	39	36	"
Carman No. 3	341	..	323	24	17	36	"
Pride of the Market	341	..	308	..	33	..	Long, pink and white.
Penn. Manor	341	..	312	24	28	36	Long, pink.
Hale's Champion	336	36	281	36	55	..	Long, white.
Vick's Extra Early	336	36	308	..	28	36	Oval, white.
Rawdon Rose	336	36	281	36	55	..	Oblong, pink and white.
Houlton Rose	332	12	310	12	22	..	Long, pink.
Brownell's Winner	332	12	310	12	22	..	"
Beauty of Hebron	330	..	275	..	55	..	Round, pink and white.
Vanier	327	48	301	36	24	12	Long, pink.
Pearce's Prize Winner	323	24	299	12	24	12	Long, white.
Prolific Rose	319	..	268	24	50	36	Oblong, pink and white.
McIntyre	316	48	277	12	39	36	Round, white and blue.
White Beauty	316	48	281	36	35	12	Long, round, white.
Mortgage Lifter	316	48	250	48	66	..	Oblong, white.
Great Divide	312	24	290	24	22	..	Long, white.
Sir Walter Raleigh	310	12	286	..	24	12	Round, pink and white.
Seedling No. 230	308	..	250	48	57	12	Round, white.
Early St. George	303	36	255	12	48	24	Oblong, pink and white.
Quaker City	303	36	259	36	44	..	Round, white
Pearce's Extra Early	297	..	264	..	33	..	Long, pink.
Everett	294	48	237	36	57	12	Flattish, pink.
Money Maker	292	36	246	24	46	12	Long, pink and white.
Country Gentleman	292	36	275	..	17	36	"

POTATOES—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Total Yield per Acre.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Prize Taker	290	24	235	24	55	..	Round, white.
Dakota Red	290	24	246	24	44	..	Round, red.
Irish Cobbler	290	24	253	..	37	24	Round, white.
Flemish Beauty	288	12	253	..	35	12	Long, flat, pink.
Columbus	288	12	259	36	28	36	Long, white.
Northern Spy	286	..	264	..	22	..	Round, red.
Maggie Murphy	286	..	264	..	22	..	Long, pink.
Delaware	279	24	244	24	33	..	Round, white.
Thorburn	277	12	248	36	28	36	Oblong, pink, white.
Calico	277	12	211	12	66	..	Long, pink and white.
General Gordon	275	..	246	24	28	36	Oblong, pink.
Ohio Junior	275	..	253	..	22	..	Round, pink.
Burnaby Seedling	272	48	261	48	11	..	Round, pink.
American Giant	272	48	244	12	28	36	Long, white.
Early Norther	272	48	250	48	22	..	Long, pink and white.
Uncle Sam	270	36	237	36	33	..	Oblong, white.
Maule's Thoroughbred	268	24	235	24	33	..	Oblong, white.
Green Mountain	266	12	233	12	33	..	Oval, white.
I. X. L	266	12	244	12	22	..	Long, pink and white.
New Queen	264	..	220	..	44	..	Oblong, pink.
Rochester Rose	264	..	233	12	30	48	Oblong, pink.
Early White Prize	259	36	242	0	17	36	Round, white.
Lizzie's Pride	259	36	226	36	33	..	Long, pink.
Early Harvest	257	24	224	24	33	..	Oval, pink and white.
Early Andes	255	12	198	..	57	12	Round, pink.
New Variety No. 1	253	..	220	..	33	..	Round, pink.
Carman No. 1	250	48	215	36	35	12	Flat, round, white.
Early Puritan	248	36	237	36	11	..	Long, white.
Empire State	233	12	220	..	13	12	Oval, white.
Sharpe's Seedling	224	24	200	12	24	12	Round, pink and white.
State of Maine	222	12	182	36	39	36	Round, white.
Early Six Weeks	220	..	182	36	37	24	Oblong, pink.
Lee's Favourite	220	..	180	24	39	36	Round, white.
Early Sunrise	213	24	187	..	26	24	Long, pink.
Chicago Market	211	12	189	12	22	..	Long, red.
Up to Date	211	12	167	12	44	..	Round, white.
Burpee's Extra Early	211	12	189	12	22	..	Long, pink and white.
American Wonder	209	..	193	36	15	24	Round, white.
Reading Giant	209	..	147	24	61	36	Oval, pink.
Reeve's Rose	204	36	176	..	28	36	Long, pink.
Daisy	200	12	167	12	33	..	Long, pink and white.
Early Market	193	36	154	..	39	36	Round, pink.
Bovee	191	24	158	24	33	..	Long, pink.
Early Rose	187	..	165	..	22	..	Long, pink.
Polaris	187	..	165	..	22	..	Long, white.
Clarke's No. 1	187	..	165	..	22	..	Long, pink.
Earliest of All	187	..	160	36	26	24	Long, pink.
Early Ohio	176	..	154	..	22	..	Long, pink.
Early Michigan	171	36	138	36	33	..	Long, white.

EXPERIMENTS WITH MILLET.

The land on which the millets were grown was a clay loam and had potatoes on it for a previous crop. It was manured in the fall of 1899 for the potatoes at the rate of 25 one-horse cart loads of manure per acre. The land was ploughed after the potatoes were removed and worked up the following spring with the disc, spring-tooth and smoothing harrows. The seed was sown June 5 with the Planet Junior seed drill. The plots were one-fortieth acre each. Seven varieties were sown, and the crop was cut and weighed September 14. The yield per acre was calculated from the plots as follows:—

EXPERIMENTS WITH MILLET.

Name of Variety.	Yield per Acre.	
	Tons.	Lbs.
Japanese	12	1,000
Moha Hungarian	12	800
Italian, or Indian	11	
Cat-tail	8	1,800
German, or Golden	8	200
Pearl	4	1,200

EXPERIMENTS WITH SOJA BEANS.

Experiments were again conducted with soja beans to gain information as to their value as a forage crop, and also to find out the yield per acre from this crop sown at different distances apart. The soil used was a clay loam, which had potatoes on it as a previous crop. It was manured for the potatoes in the fall of 1899 with stable manure, at the rate of 25 one-horse cart loads per acre. The land was ploughed after the potatoes were dug, and worked up the following spring with the disc, spring-tooth and smoothing harrows. The beans were sown with the Wisner seed drill, June 10, in rows 21, 28 and 35 inches apart, and the crop was cut and weighed October 1. The yield per acre has been calculated from the quantity obtained from plots of one-fortieth acre each. The crop made strong growth, but the beans had only just commenced to form at date of cutting. The season here does not appear to be long enough to bring this crop to sufficient maturity to make it valuable.

Distances apart.	Yield per Acre.	
	Tons.	Lbs.
Soja beans, 21 inches	8	1,800
" 28 "	7	1,000
" 35 "	6	400

EXPERIMENTS WITH HORSE BEANS.

Experiments were also conducted with the English horse bean, the variety 'Tick' being used. They were sown at different distances in rows 21, 28 and 35 inches apart. The soil was similar to that on which the soja beans were grown, and received the same treatment. The beans were on plots of one-fortieth acre each. These made good growth during the first part of the season, but were almost destroyed, as were all the other horse beans on the farm, by the 'Black Dolphin' horse bean aphis, which infested the plants in countless numbers.

Distances apart.	Yield per Acre.	
	Tons.	Lbs.
Horse beans, 21 inches	3	1,000
" 28 "	3	1,680
" 35 "	5	

EXPERIMENTS WITH FERTILIZERS ON WHEAT.

Experiments to test the value of different kinds of fertilizers on this grain crop were again conducted this year. The Preston wheat was used. The size of each plot was one-fortieth acre, and six plots made up the test. The land on which these tests were carried on was a poor light clay loam. The previous crop was grain, having received for that crop 100 pounds complete fertilizer per acre. This land has never had any stable manure, and having been cropped several times, was in a poor state of fertility.

The land was ploughed in the spring, and was worked up with the spring-tooth twice, and once with the smoothing harrow before seeding. The grain was sown with the seed drill June 6, and harvested September 3.

One-half of the nitrate of soda for plots 1 and 2 was sprinkled finely over the ground when the grain was 2 inches high, and the other half when it was 6 inches high. The fertilizer used in plots 4 and 5 was scattered on the ground just before sowing and lightly covered with the harrow. On plot 6 one-half of the fertilizer was scattered finely over the ground before sowing, and lightly covered with the harrow, and the other half was sprinkled over the ground when the grain was 2 or 3 inches high. Plot 3 was not fertilized, being left for a check. The results were as follows:—

Plot.	Variety of Wheat sown.	Fertilizers used per Acre.		Yield per Acre.	
			Lbs.	Bush.	Lbs.
1	Preston	Nitrate of soda	100	23	20
2	"	"	200	22	00
3	"	Check		20	00
4	"	Superphosphate	400	22	00
5	"	Muriate of potash	400	24	20
6	"	A mixture of—			
		Superphosphate	200		
		Muriate of potash	100		
		Nitrate of soda	100	23	20

SPECIAL EXPERIMENTS WITH FERTILIZERS.

Experiments for the purpose of ascertaining the relative value of fertilizers, commonly used for field crops of various kinds, were again conducted this year.

The plots were one-eighth acre each, 38 x 143½ feet, for each kind of fertilizer used. These were subdivided into ten strips 14 feet wide, each running lengthwise across all the differently fertilized plots. These strips were sown with ten different kinds of crops, namely, potatoes, mangels, turnips, carrots, corn, oats, pease, barley, wheat and mixed grain, making in all 140 plots. A margin of two feet was left between each plot, and one foot between each crop plot. Two plots were left without any fertilizers to serve as check plots. Each of the crops were sown at about the same time as the uniform test plots of the particular crop, with the same amount of seed per acre, and were cultivated in the same manner. The strips that are in grain one year are planted to roots, potatoes and corn the following year, and vice versa. The quantity and kinds of fertilizers used are applied each year. This is the third year of the test. The following table gives the yield per acre of the various crops, as calculated from the quantity obtained from each plot:—

SPECIAL EXPERIMENTS WITH FERTILIZERS.

Fertilizer Used.	Barley, Duckbill.		Oats, Banner.		Wheat, Colorado.		Mixed Grain—Oats, barley, pease.		Pease, Golden Vine.		Indian Corn.		Turnips.		Mangels.		Carrots.		Potatoes—Delaware and State of Maine.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Manure, 30 tons..	58	16	70	20	36	40	75	16	41	40	18	1,000	29	500	24	1,000	28	1,000	396	40
Manure, 15 tons, fertilizer, 250 lbs.......... .	60	20	73	18	33	20	73	18	38	20	18	1,000	31	500	22	700	25	0	428	20
Complete fertilizer, 1,000 lbs	47	44	58	28	28	20	58	28	33	20	17	1,000	24	500	15	1,000	18	500	340	0
Complete fertilizer, 500 lbs.	45	40	52	32	25	0	55	30	30	0	14	0	23	0	16	0	18	1,000	315	0
Check (no fertilizer)......	33	16	44	26	23	20	44	4	31	40	13	0	18	1,000	15	700	15	1,000	250	0
Bone meal, 1,000 lbs.....	39	28	55	30	26	40	67	22	30	0	13	1,500	23	1,500	20	0	19	0	308	20
" 500 "	37	24	58	28	30	0	52	32	28	20	14	500	23	500	18	700	21	200	273	20
Ashes, 2,500 "	34	16	50	0	25	0	44	4	38	20	15	0	23	1,000	18	1,500	21	1,000	325	0
Manure, rotted, 20 tons ..	56	12	67	22	33	20	73	18	45	0	17	1,000	30	0	20	1,700	27	500	495	0
Check (no fertilizer).....	34	16	41	6	21	40	41	6	35	0	13	1,500	19	500	10	700	15	500	248	20
Land plaster, 500 lbs	35	20	47	2	23	20	50	0	36	40	13	1,500	19	500	9	1,950	17	500	230	0
Salt, 500 "	43	36	52	32	26	40	52	32	40	0	15	0	21	1,500	15	1,520	21	0	221	40
Marsh mud, 100 tons.....	45	40	64	24	30	0	61	26	41	40	16	0	26	500	21	500	24	800	293	20
Manure, 20 tons (green) ..	50	0	67	22	33	20	70	20	45	0	22	1,000	30	300	27	1,300	29	900	418	20

FIELD CROP OF CORN.

Two acres of corn was grown on land that had timothy as a previous crop. It was manured on the sod in the fall of 1900, with 20 one-horse cart loads of stable manure per acre. This was ploughed June 1, when a good crop of grass was turned under with the manure. The land was then worked up with the disc, spring-tooth and smoothing harrows, and the seed sown June 3 with the grain drill in rows three feet apart. This corn made excellent growth. The yield obtained was 31 tons.

Two acres was also grown on land that was previously seeded to clover in the spring of 1900, together with a pea crop. The pea aphis destroyed the pea crop, and the clover produced a grand aftermath by fall. This was manured in the autumn, and in the spring was ploughed and worked up, and the corn sown June 6 in rows 3 feet apart. The varieties 'Longfellow' and 'Selected Leaming' were mixed and sown together. The yield obtained from this field was 34 tons 650 pounds.

One acre was grown on land that was of poor fertility, not having had any manure previously. The previous crops were grain, with one crop of pease ploughed under in the year 1899. This land was manured this spring at the rate of 30 one-horse cart loads per acre, which was spread broadcast and ploughed under. It was then worked up with the disc, spring-tooth and smoothing harrows, after which the seed was sown in rows 3 feet apart. The variety, 'Angel of Midnight,' was sown. The yield from this field was 13 tons. The crop was sown June 6, and harvested October 1.

FIELD CROP OF TURNIPS.

The soil of this field was a clay loam in a poor state of fertility. It had never had any manure before. The previous crops were grain, and with the exception of a crop of pease ploughed under in 1899, no fertilizer had been previously given. The land was ploughed in the fall of 1900, and in the spring was disc-harrowed, after which 30 one-horse cart loads of stable manure per acre was spread and ploughed under. It was then worked with the disc, spring-tooth and smoothing harrows, after which 200 pounds of complete fertilizer was sown on one-half of each one acre plot.

This was harrowed in with the smoothing harrow, and drills were run 24 inches apart, and the seed sown with the turnip seeder. Four varieties were sown in one acre plots each, one-half of which were manured and fertilized, the other half having received manure only. The following yields were obtained per acre:—

FIELD CROPS OF TURNIPS.

Name of Variety and size of plots.	Yield per acre.		Yield per acre.	
	Tons	lbs.	Bus.	lbs.
½ acre plots—				
Carter's Elephant, manure with fertilizer	18	1,260	621	..
" " only	16	220	537	..
Drummond Purple Top, manure with fertilizer	17	1,625	593	45
" " only	15	750	512	30
Skirvings, manure with fertilizer	18	1,275	621	15
" " only	18	795	613	15
Purple Top	18	1,800	630	..

FIELD CROPS OF MANGELS.

The land on which the field mangels were grown was a clay loam in a good state of fertility, the previous crop having been clover, the aftermath of which was ploughed under in the fall of 1900. This was disc-harrowed the following spring, and 20 one-horse cart loads of stable manure per acre was spread and ploughed under. This was then worked up with the disc, spring-tooth and smoothing harrows, after which complete fertilizer was sown broadcast at the rate of 400 pounds per acre on one-half of each one acre lot and harrowed in. The other half acre of each lot was left without any commercial fertilizer.

Drills were run 24 inches apart, and the seed planted in holes one foot apart, made with a marker and from 3 to 6 seeds were dropped in each hole. These were covered by running a land roller over the rows. Four varieties of mangels were sown in these plots, and the following yields were obtained:—

FIELD CROPS OF MANGELS.

Name of Variety and Size of Plot.	Yield per acre.		Yield per acre.	
	Tons	lbs.	Bus.	lbs.
½ acre plot—				
Mammoth Long Red, manure with fertilizer	30	1,520	1,025	20
" " only	27	120	902	..
Yellow Globe, manure with fertilizer	31	1,320	1,055	20
" " only	29	360	972	40
Yellow Intermediate, manure with fertilizer	35	600	1,176	40
" " only	34	1,150	1,162	30
Gate Post	24	1,500	825	..

HAY.

One field containing eight acres which was seeded down to clover and timothy in the spring of 1900, yielded 26 tons 320 pounds.

Three acres of clover and timothy, seeded down the same spring, yielded 5 tons 275 pounds.

One field of eight acres, seeded down the same year, yielded 19 tons 110 pounds.

This hay was all secured in excellent condition, and was grown on the upland.

Four acres of clover and timothy on the marsh, seeded down in the spring of 1900, yielded 10 tons 1,100 pounds.

Thirty-six acres of marsh also yielded 72 tons 1,310 pounds of timothy hay.

The total amount harvested was 133 tons 1,105 pounds, which was secured in first-class condition.

GRAIN AND POTATO DISTRIBUTION.

Some of the most promising varieties of seed grain and potatoes were again distributed this year to farmers making application from different parts of the provinces.

The following number of three-pound lots were sent to the various applicants:—

Oats	260
Barley	78
Wheat	89
Pease	22
Buckwheat	10
Winter Rye	8
Potatoes	278
Total	745

CORRESPONDENCE.

Apart from the receipt and despatch of circulars, there were 1,416 letters received and 1,211 sent out during the year.

AGRICULTURAL MEETINGS AND EXHIBITIONS.

I attended and addressed the following agricultural meetings during the year:—

New Brunswick Farmers' and Dairyman's Association Annual Meeting, Fredericton, January 22, 23 and 24.

Nova Scotia Farmers' Association Annual Meeting, Kentville, January 30, 31 and February 1.

Also farmer's meetings at Charlottetown, P.E.I., February 3.

Cardigan, P.E.I., February 4.
Middleton, P.E.I., February 8.
Charlottetown, P.E.I., February 9.
Lessonville, N.B., May 16.
Fort Lawrence, N.S., November 12.

I also addressed a series of lectures to the students of the Sussex Dairy School from 7th to 21st March.

Besides these I attended the following exhibitions:—

Winter Fair, Guelph, December 11 to 15.
Toronto Industrial, August 26 to September 7.
Pan-American Exhibition, Buffalo, N.Y.
Sussex, N.B.
Sackville, N.B.
Port Elgin, N.B.

An exhibit of farm produce was made by the Experimental Farm, Nappan, at the Nova Scotia Provincial Exhibition, Halifax, N.S., made up of the different sorts of grains, roots, fruits and vegetables grown here.

LIVE STOCK.

HORSES.

Six are the number at present kept on the farm, four of which are used exclusively for draught purposes, one for general purposes, and one driver.

During the year one horse has died. His death was caused by acute indigestion. Another of the older horses (16 years old) was exchanged for a younger and more suitable horse. Besides these, the use of one team was had during the summer months for their feed.

DAIRY CATTLE.

During the year an addition has been made to the herd of: 1 Guernsey bull, 1 Guernsey cow, 1 Ayrshire cow and 1 Ayrshire heifer, newly imported, also two Jersey cows. Some exchanges were made during the year of old and blemished cows for others. Three deaths have occurred during the year. One, an Ayrshire from milk fever, one Holstein from eversion of the uterus, and one grade cow from milk fever. The herd at present consists of:—

1 Guernsey bull, 6 years old.
1 Guernsey bull, 2½ years old.
1 Guernsey bull, 1½ years old.
1 Ayrshire bull, 1½ years old.
1 Holstein bull, 10 months old.
3 Guernsey cows.
1 Guernsey heifer, 10 months old.
2 Ayrshire cows.
2 Ayrshire cows, 3 years old.
1 Ayrshire heifer, 2 years old.
1 Ayrshire heifer, 10 months old.
1 Holstein cow.
1 Holstein cow, 3 years old.
1 Holstein heifer, 10 months old.
2 Jersey cows.
19 Grade milch cows.
6 Grade heifers, 1½ years old.
5 Grade heifers, 10 months old.

We have also at present on hand 16 grade shorthorn steers on experiment, and 12 grade shorthorn steer calves also on experiment. Total, 78 head.

EXPERIMENTS WITH COWS.

The experiment with the dairy herd during the past year was along the same lines as that of 1900, namely, to determine whether a fairly good dairy herd, well fed and cared for, would leave a credit balance after paying for feed consumed at current prices. The experiment was begun on December 2, 1900, and continued to December 1, 1901.

The price of feed this year was about the same as last year, and the prices of the products were higher than last year. Wheat bran was charged at $19.35 per ton, corn at $22.50 per ton, oats at $22.50 per ton, and pea meal, $27 per ton, making an average price of mixed meal ration, as per proportion fed to cows, of 1⅛ cents per pound. Roots were valued at 5 cents per bushel, ensilage $2 per ton, and hay at $8 per ton.

The rations fed the cows in full milk in winter was, ensilage or roots, 50 pounds; meal, 10½ pounds, and hay, 10 pounds, making an average cost of 19¾ cents per cow per day.

When not milking in winter they were charged $3 per month.

Different quantities were fed to different cows according to their capacity to consume and produce.

Thirteen were in full milk when the test began, the remainder coming fresh at various times till spring. They were kept in the stable from November 1, 1900, to June 1, 1901, except on occasional fine days when they were allowed out in the yard.

They were fed regularly twice each day, and had water before them all the time. The temperature of the stable was kept at 60° Fahrenheit, as nearly as possible all the time.

They were fed, cared for and milked as regularly as possible by the same persons all the time.

They were put to pasture early in June, and until toward the end of August were left out the greater part of the time, night and day. During September and October they were kept in the stable the greater part of the time.

With the exception of the first two weeks after being turned out, they were fed entirely in the stable, on cut green feed, clover and pease, oats and vetches grown together for that purpose, and sown at intervals of from one week to ten days apart. Owing to the extremely dry weather the crop was only fair, and at least 15 acres of green feed were consumed by the herd during the summer.

While milking in summer they were charged $2.50 per month, and $1.50 per month when dry.

The milk of each cow was weighed at milking, twice each day, and a careful record kept of the number of pounds given.

The percentage of fat in the milk of each cow was determined by the Babcock milk tester, and the fat credited to the cows on the basis that 85 pounds fat produces 100 pounds marketable butter.

The milk was sent to the Nappan dairy station, and the cows were credited with the butter produced at the prices paid to all patrons of that station, which averaged for the year 23 cents per pound, less 4 cents per pound for manufacturing butter and hauling milk.

The skim milk was fed to calves and pigs, and credited to the cows at the rate of 15 cents per 100 pounds.

The following table will show the results obtained during the year:—

Name.	Breed.	Days Milking.	Milk.	Fat.	Fat.	Butter.	Value Butter.	Value Skim Milk.	Total Credit.	Cost Feed.	Cost Making Butter.	Total Cost.	Profit.
			Lbs.	p. c.	Lbs.	Lbs.	$ cts.	$ cts	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
Molly	Ay. Sh Gr.	295	8650	3·9	337·35	396·88	91 28	8 65	99 93	46 90	15 87	62 77	37 16
Corie	"	260	8186	4·0	327·44	385·22	88 60	8 18	96 78	48 95	15 40	64 35	32 43
Aiton.	Ay. Grade.	309	9495	3·4	322·83	377·40	86 80	9 43	96 23	48 75	15 9	63 84	32 39
Carrie	"	253	7203	3·6	259·30	305· 6	70 16	7 20	77 36	44 15	12 20	56 35	21 1
Dolly	"	266	8229	3·1	255· 9	300·10	69 2	8 22	77 24	44 30	12	56 30	20 94
Ida B	"	288	6267	4·0	250·68	294·91	67 82	6 26	74 8	45 80	11 79	57 59	16 49
Rex's Maud	Guernsey.	211	4767	4·8	228·81	279·19	64 21	4 76	68 97	42 86	11 16	54 2	14 95
Bell	Ay Grade.	239	5812	4·4	255·72	300·85	69 19	5 81	75	48 95	12 3	60 98	14 2
Lucy	Sh. Ay. Gr.	288	7716	3·1	239·19	281·40	64 72	7 71	72 43	47 36	11 25	58 61	13 82
Ilda Rooker.	Holstein.	340	7070	3·4	240·38	282·80	65 4	7 7	72 11	47 65	11 31	58 96	13 15
Jesse P.	Ay. Gr.	239	6056	3·6	218· 1	256·49	58 99	6 5	65 4	42 18	10 25	52 43	12 61
Ida Rooker	Holstein	237	7490	3·3	247·17	290·78	66 87	7 49	74 36	51 95	11 63	63 58	10 78
Annie	Sh. Ay. Gr	190	4966	3·8	188·70	222·	51 6	4 96	56 2	42 27	8 88	51 15	4 87
Lady Lockerby	Ayrshire.	239	5297	3·6	190·69	224·34	51 59	5 29	56 88	43 54	8 97	52 51	4 37
Daisy	Ay. Gr.	309	6227	3·4	211·71	249· 8	57 28	6 22	63 50	49 50	9 96	59 46	4 4
Templeton	"	288	5632	3·4	191·48	225·28	51 81	5 63	57 44	45 42	9 1	54 43	3 1
Alice	Ayrshire.	330	5038	4·0	201·52	237· 8	54 52	5 3	59 55	47 22	9 48	56 70	2 85
Ada C	Ay. Gr.	204	4196	4·0	167·84	197·45	45 41	4 19	49 60	39 65	7 89	47 54	2 6
Beatrice	Ayrshire	260	3869	4·8	185·71	218·48	50 25	3 86	54 11	43 67	8 73	52 40	1 71
Polly	Ay. Gr.	239	4196	3·9	163·64	192·52	44 27	4 19	48 46	39 5	7 70	46 75	1 71
													Loss.
Jane	"	225	4648	3·6	167·32	196·85	45 27	4 64	49 91	46 25	7 87	54 12	4 21
Violet	"	288	4909	3·0	147·27	173·25	39 84	4 90	44 74	44 90	6 93	51 83	7 09

EXPERIMENTS WITH STEERS.

This test was carried on with a view to establish some data as regards the advisability of dehorning full grown steers at the commencement of their feeding period, whether fed in loose boxes or tied in stalls.

Twenty-one $3\frac{1}{2}$-year old steers and three $2\frac{1}{2}$ years old were used for this test, in 3 lots of 8 each of as nearly as possible equal form, features and weight (shorthorn grades).

They were bought on October 30 and weighed the next morning, after having fasted 14 hours. The horns were then taken off lots 1 and 2 and left on lot 3. Lot 1 was put into loose box stalls, and lots 2 and 3 were tied up in stalls.

The dehorning was done with the keystone dehorning clipper.

While all bled profusely, few seemed to suffer much, although by careful weighing before, and repeatedly after dehorning, it was again found that at least two weeks were required to regain the loss in weight from dehorning.

All lots were fed alike as nearly as possible from start to finish of test, and kept in the stable all the time, except on occasional fine days when they were let out for a time, averaging not more than once each week.

Another lot of 4 of the same ages and quality as the others, as near as possible, were dehorned, fed and cared for in precisely the same manner as lots 1, 2 and 3, with the exception of being turned out daily for water.

The feeds were charged at the following prices:—Hay, $8 per ton; straw, $3 per ton; roots, $2 per ton; ensilage, $2 per ton; mixed meals averaged $22.50 per ton as per proportion fed.

RECORD of Steers fed from November 16, 1900, to March 31, 1901.

LOT I.—DEHORNED, FED IN LOOSE BOX.

Numbers.	Nov. 16.	Dec. 1.	Gain.	Dec. 16.	Gain.	Dec. 31.	Gain.	Jan. 15.	Gain.	Jan. 30.	Gain.	Feb. 14.	Gain.	Mar. 1.	Gain.	Mar. 16.	Gain.	Mar. 31.	Gain.	Total Gains.
	Lbs.	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.
17	1,385	1,430	45	1,450	20	1,520	70	1,575	55	1,620	40	1,650	30	1,670	20	1,690	20	1,715	25	330
18	1,320	1,350	30	1,400	50	1,475	75	1,525	50	1,560	35	1,605	45	1,635	30	1,650	15	1,670	20	350
19	1,250	1,310	60	1,340	30	1,400	60	1,415	15	1,450	35	1,485	35	1,520	35	1,550	30	1,575	25	325
20	1,275	1,300	25	1,350	50	1,405	55	1,445	40	1,490	45	1,525	35	1,550	25	1,585	35	1,615	30	340
21	1,200	1,220	20	1,300	80	1,360	60	1,380	20	1,420	40	1,455	35	1,500	45	1,520	20	1,545	25	345
22	1,230	1,275	45	1,315	40	1,325	10	1,350	25	1,400	50	1,450	50	1,470	20	1,480	10	1,490	10	260
23	1,150	1,175	25	1,200	25	1,280	80	1,325	45	1,400	75	1,450	50	1,470	20	1,495	25	1,515	20	365
24	1,080	1,100	20	1,125	25	1,200	75	1,225	25	1,275	50	1,325	50	1,340	15	1,390	50	1,415	25	335
Totals	9,890	10,160	270	10,480	320	10,965	485	11,240	275	11,615	370	11,945	330	12,155	210	12,360	205	12,540	180	2,650

LOT II.—DEHORNED, TIED IN STALLS.

Numbers.	Nov. 16.	Dec. 1.	Gain.	Dec. 16.	Gain.	Dec. 31.	Gain.	Jan. 15.	Gain.	Jan. 30.	Gain.	Feb. 14.	Gain.	Mar. 1.	Gain.	Mar. 16.	Gain.	Mar. 31.	Gain.	Total Gains.
1	1,450	1,535	85	1,570	35	1,625	55	1,675	50	1,695	20	1,710	15	1,780	70	1,805	25	1,810	5	360
2	1,300	1,325	25	1,385	60	1,425	40	1,470	45	1,510	40	1,545	35	1,565	20	1,585	20	1,605	20	305
3	1,375	1,430	55	1,460	30	1,475	15	1,500	25	1,540	40	1,575	35	1,605	30	1,630	25	1,655	25	280
4	1,260	1,280	20	1,340	60	1,350	10	1,430	80	1,470	40	1,500	30	1,525	25	1,545	20	1,550	5	290
5	1,340	1,350	10	1,400	50	1,445	45	1,490	45	1,520	30	1,550	30	1,585	35	1,600	15	1,610	10	270
6	1,250	1,290	40	1,340	50	1,375	35	1,425	50	1,430	5	1,440	10	1,480	40	1,500	20	1,520	20	270
7	1,135	1,200	65	1,215	15	1,235	20	1,270	35	1,300	30	1,320	20	1,355	35	1,360	5	1,390	30	255
8	1,015	1,060	45	1,080	20	1,100	20	1,130	30	1,165	35	1,200	35	1,220	20	1,215	25	1,270	25	255
Totals	10,125	10,470	345	10,790	320	11,030	240	11,390	360	11,630	240	11,840	210	12,115	275	12,270	155	12,410	140	2,285

Record of Steers fed, November 16 to March 31, 1901—*Concluded.*

LOT III.—NOT DEHORNED, TIED IN STALLS.

Numbers.	Nov. 16.	Dec. 1.	Gain.	Dec. 16.	Gain.	Dec. 31.	Gain.	Jan. 15.	Gain.	Jan. 30.	Gain.	Feb. 14.	Gain.	Mar. 1.	Gain.	Mar. 16.	Gain.	Mar. 31.	Gain.	Total Gains.
	Lbs.	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.	Lbs	Lbs.
9	1,370	1,375	5	1,410	35	1,460	50	1,490	30	1,525	35	1,555	30	1,575	20	1,600	25	1,625	25	255
10	1,320	1,375	55	1,390	15	1,430	40	1,460	30	1,490	30	1,525	35	1,535	10	1,565	30	1,600	35	280
11	1,330	1,360	30	1,400	40	1,410	10	1,450	40	1,490	40	1,535	45	1,560	25	1,605	45	1,610	5	280
12	1,310	1,365	55	1,390	25	1,410	20	1,500	90	1,540	40	1,570	30	1,580	10	1,610	30	1,640	30	330
13	1,200	1,230	30	1,275	45	1,300	25	1,330	30	1,360	30	1,385	25	1,395	10	1,425	30	1,455	30	255
14	1,160	1,190	30	1,250	60	1,275	25	1,330	55	1,360	30	1,385	25	1,425	40	1,440	15	1,460	20	300
15	1,120	1,150	30	1,175	25	1,210	35	1,220	10	1,260	40	1,300	40	1,340	40	1,365	25	1,375	10	255
16	1,120	1,150	30	1,200	50	1,230	30	1,300	70	1,310	10	1,320	10	1,340	20	1,365	25	1,390	25	270
Totals	9,930	10,195	265	10,490	295	10,725	235	11,080	355	11,335	255	11,575	245	11,750	175	11,975	225	12,155	180	2,225

LOT IV.—DEHORNED, FED IN LOOSE BOX, TURNED OUT TO WATER.

Numbers.	Nov. 16.	Dec. 1.	Gain.	Dec. 16.	Gain.	Dec. 31.	Gain.	Jan. 15.	Gain.	Jan. 30.	Gain.	Feb. 14.	Gain.	Mar. 1.	Gain.	Mar. 16.	Gain.	Mar. 31.	Gain.	Total Gains.
25	1,060	1,080	20	1,140	60	1,200	60	1,215	15	1,260	45	1,320	60	1,340	20	1,360	20	1,380	20	320
26	1,020	1,030	10	1,060	30	1,125	65	1,135	10	1,145	10	1,195	45	1,220	25	1,260	40	1,290	30	270
27	1,025	1,075	50	1,115	30	1,150	35	1,175	25	1,200	25	1,250	50	1,270	20	1,290	20	1,310	20	285
28	975	1,010	35	1,035	25	1,070	35	1,095	25	1,125	30	1,165	40	1,175	10	1,210	35	1,230	20	255
Totals	4,080	4,195	115	4,350	145	4,545	195	4,626	75	4,730	110	4,930	200	5,005	75	5,120	115	5,210	90	1,130

COST OF 1 STEER PER DAY FOR ENTIRE PERIOD.

Period.	Daily Ration.	Daily Cost.	Cost for Period.	—
		$ cts.	$ cts.	$ cts.
Nov. 16 to Dec. 1	Roots, 90 lbs	0 09	1 35	
	Meal, 2 lbs	0 02¼	0 33¾	
	Straw, 10 lbs	0 02½	0 37½	
				2 06¼
Dec. 1 to Dec. 31	Roots, 60 lbs	0 06	1 80	
	Meal, 4 lbs	0 4½	1 35	
	Hay, 10 lbs	0 04	1 20	
				4 35
Dec. 31 to Jan. 30	Roots, 50 lbs	0 05	1 50	
	Meal, 6 lbs	0 06¾	2 02½	
	Hay, 15 lbs	0 06	1 80	
				5 32½
Jan. 30 to March 1	Roots, 30 lbs	0 03	0 90	
	Meal, 8 lbs	0 09	2 70	
	Hay, 12 lbs	0 05	1 50	
				5 10
March 1 to March 31	Ensilage, 20 lbs	0 02	0 60	
	Meal, 9 lbs	0 10⅛	3 03¾	
	Hay, 12 lbs	0 05	1 50	
				5 13¾
Cost of feed of 1 steer				21 97½
" 28 steers				615 30

Original weight 34,025 lbs. steer at 4⅛c. per lb	$1,403 53
Weight at finish, 42,315 lbs. at 5⅛c. per lb	2,168 64
Balance	765 11
Cost of feed for lot, 135 days	615 30
Net profit	149 81

Daily rate of gain per steer	2·19
Cost of 1 lb. gain	7·42c.
" feed per day per steer	16·27c.
Profit per steer	$5.35

STEER-CALF EXPERIMENTS.

With a view to getting some particulars as to the cost of a beef bullock when ready for market, and also a comparison of limited and full feeding, twelve shorthorn grade calves were brought early in May, and divided into two groups of six each.

Lot No. 1 was fed what is termed a 'full fattening ration.'

Lot No. 2 was fed what is termed a 'limited growing ration.'

In estimating the cost of feeding calves, the following values were placed on the various feeds:—

New milk, $1 per 100 pounds.
Skim milk, 15 cents per 100 pounds.
Bibby's Cream Equivalent, $3.50 per 100 pounds.
Wheat bran, 95 cents per 100 pounds.
Crushed oats, $1 per 100 pounds.
Roots or ensilage, 10 cents per 100 pounds.
Hay, $8 per ton.

FULL FATTENING RATION—SIX STEERS, CALVES.

Period.	Daily Ration per Calf.	Amount Fed during Period.	Cost.	Total Cost.
		Lbs.	$ cts.	$ cts.
May 16 to June 1	12 lbs. whole milk	1,080	10 80	
	8 " skim milk	720	1 08	
				11 88
June 1 to July 1	10 " whole milk	1,800	18 00	
	10 " skim milk	1,800	2 70	
	¼ " bran and oil cake	37½	0 37	
				21 07
July 1 to Aug. 1	8 " whole milk	1,488	14 88	
	12 " skim-milk	2,232	3 34	
	½ " bran and oil cake	93	0 93	
				19 15
Aug. 1 to Sept. 1	20 " skim-milk	3,720	5 58	
	1 " cream equivalent	186	6 50	
	½ " bran and oil cake	93	0 93	
	2 " hay	372	1 49	
				14 50
Sept. 1 to Oct. 1	10 " skim-milk	1,800	2 70	
	1 " cream equivalent	180	6 30	
	½ " bran and oil cake	90	0 90	
	2 " hay	360	1 44	
				11 34
Oct. 1 to Nov. 1	10 " ensilage	1,860	1 86	
	1 " crushed oats	186	1 86	
	½ " bran and oil cake	93	0 93	
	2 " hay	372	1 49	
				6 14
Nov. 1 to Dec. 1	20 " roots	3,600	3 60	
	1 " crushed oats	180	1 80	
	½ " bran and oil cake	90	0 90	
	2 " hay	360	1 44	
				7 74
				91 82

FULL FATTENING RATION—SIX STEERS, CALVES.

Period.	Weight at Start.	Weight at Finish.	Gain.
1900.	Lbs.	Lbs.	Lbs.
May 16 to June 1	1,000	1,130	130
June 1 to July 1	1,130	1,435	305
July 1 to Aug. 1	1,435	1,810	375
Aug. 1 to Sept. 1	1,810	2,160	350
Sept. 1 to Oct. 1	2,160	2,460	300
Oct. 1 to Nov. 1	2,460	2,730	270
Nov. 1 to Dec. 1	2,730	2,975	245

Total gain, May 16 to Dec 1	Lbs.	1,975
Weight at start	"	1,000
" finish	"	2,975
Daily rate of gain per steer	p. c.	1·64
Cost of 1 lb. gain	cts.	4·64
" feed per day per steer	"	7·72
" " of lot, 198 days	$	98·1

LIMITED GROWING RATION—SIX STEERS, CALVES.

Period 1900.	Daily Ration per Calf.	Amount fed during period.	Cost.	
		Lbs.	$ cts.	
May 16 to June 1	8 lbs. whole milk	720	7 20	
	12 lbs. skim-milk	1,080	1 62	
				8 82
June 1 to July 1	8 lbs. whole milk	1,440	14 40	
	12 lbs. skim-milk	2,160	3 24	
				17 64
July 1 to August 1	20 lbs. skim-milk	3,720	5 58	
	½ lb. cream equivalent	93	3 25	
				8 83
August 1 to Sept. 1	20 lbs. skim-milk	3,720	5 58	
	½ lb. cream equivalent	93	3 25	
	½ lb. bran and oil cake	93	0 93	
	2 lbs. hay	372	1 49	
				11 25
Sept. 1 to Oct. 1	10 lbs. skim-milk	1,800	2 70	
	½ lb. cream equivalent	90	3 15	
	½ lb. bran and oil cake	90	0 90	
	2 lbs. hay	360	1 44	
				8 19
Oct. 1 to Nov. 1	5 lbs. ensilage	930	0 93	
	½ lb. crushed oats	93	0 93	
	½ lb. bran and oil cake	93	0 93	
	2 lbs. hay	372	1 49	
				4 28
Nov. 1 to Dec. 1	10 lbs. roots	1,800	1 80	
	½ lb. crushed oats	90	0 90	
	½ lb. bran and oil cake	90	0 90	
	2 lbs. hay	360	1 44	
				5 04
				64 05

LIMITED GROWING RATION—SIX STEERS—CALVES.

Period 1900.	Weight at Start.	Weight at Finish.	Gain.
	Lbs.	Lbs.	Lbs.
May 16 to June 1	920	1,010	90
June 1 to July 1	1,010	1,260	250
July 1 to August 1	1,260	1,540	280
August 1 to Sept. 1	1,540	1,805	265
Sept. 1 to Oct. 1	1,805	2,005	200
Oct. 1 to Nov. 1	2,005	2,220	215
Nov. 1 to Dec. 1	2,220	2,375	155

Total gain, May 16th to December 1st	1,455 lbs.
Weight at start	920 "
" finish	2,375 "
Daily rate of gain per steer	1·22 lbs.
Cost of 1 lb. gain	4·40 cts.
" feed per day per steer	5·39 "
" feed of lot, 198 days	$64 05

PIGS.

The herd of pigs at present on this farm consists of Yorkshires, Berkshires, Tamworths and their crosses, in all 60 head, as follows:—

1 Yorkshire boar, registered.
1 Yorkshire sow, registered.
1 Berkshire boar, registered.
1 Berkshire sow, registered.
1 Tamworth sow, registered.
5 Grade brood sows.
50 Grade pigs from one to five months old.

TEST OF DIFFERENT FEEDS FOR SWINE.

This experiment was carried on with a view to determine the comparative feeding value of the following feeds:—

1st, buckwheat; 2nd, shorts; 3rd, corn meal and crushed oats; 4th, pea meal and crushed oats; the last two mentioned being fed in the ratio of 2 to 1. This has been carried on during the past three years.

The pigs were put into the test at the age of 3 months, in lots of four, from the same litters, at their live weight, after fasting 14 hours.

The ration complete consisted of three pounds of the above mentioned feeds, and an average of five pounds of skim milk per pig per day. When ready for market, one pig was taken from each lot each time, and these were replaced by four from another litter.

Their gains were ascertained from their increased live weight, after fasting 14 hours.

They were dressed for market on the farm, and the percentage of dressed weight ascertained in each case.

PEN NO 1.—Feed.—2 lbs. Corn Meal, 1 lb. Crushed Oats and Skim Milk.

No.	Breed.	Weight at start.	Weight at finish.	Net gain.	Number of days fed.	Daily gain.	Percentage of dressed weight.
1	Berkshire	96	170	74	60	1·23	79·21
2	Yorkshire	82	180	98	60	1·63	78·40
3	Tamworth	72	160	88	54	1·64	78·68
4	Yorkshire (D), Berkshire (S)	69	150	81	57	1·59	77·10
5	" "	65	151	86	61	1·40	77·60
6	" Tamworth (S)	65	169	104	58	1·79	81·25

PEN NO. 2.—Feed.—2 lbs. Pea Meal, 1 lb. Crushed Oats and Skim Milk.

No.	Breed.	Weight at start.	Weight at finish.	Net gain.	Number of days fed.	Daily gain.	Percentage of dressed weight.
1	Berkshire	91	164	73	60	1·21	80·21
2	Yorkshire	87	178	91	60	1·51	80· 2
3	Tamworth	82	190	88	54	1·62	79·64
4	Yorkshire (D), Berkshire (S)	77	154	77	57	1·35	78· 1
5	" "	76	149	73	61	1·19	78·33
6	" Tamworth (S)	94	204	110	58	1·89	82·10

Pen No. 3.—Feed.—3 lbs. Shorts and Skim Milk.

No.	Breed.	Weight at start.	Weight at finish.	Net gain.	Number of days fed.	Daily gain.	Percentage of dressed weight.
1	Berkshire	100	168	68	60	1·13	80·32
2	Yorkshire	77	165	88	60	1·46	77·42
3	Tamworth	94	182	88	54	1·62	78·61
4	Yorkshire (D), Berkshire (S)	69	150	81	57	1·42	78·34
5	" "	73	152	79	61	1·29	79·34
6	" Tamworth (S)	81	198	117	58	2·01	81·40

Pen No. 4.—Feed.—3 lbs. Buckwheat and Skim Milk.

1	Berkshire	87	154	67	60	1·11	79· 1
2	Yorkshire	84	175	91	60	1·51	78·43
3	Tamworth	79	161	82	54	1·51	79·63
4	Yorkshire (D), Berkshire (S)	78	153	75	57	1·31	77·46
5	" "	67	147	80	61	1·31	78·25
6	" Tamworth (S)	92	187	95	58	1·64	80·62

SHEEP.

The flock on this farm at present consists of:—

1 Pure bred Leicester ram.

5 Pure bred Leicester ewes.

6 Pure bred yearling Shropshire ewes.

6 Grade Shropshire ewes.

All are in fairly good condition.

POULTRY.

Four varieties of fowls were kept this year. Barred Plymouth Rocks, Black Minorcas, White Leghorns and White Wyandottes. The B. P. Rocks, B. Minorcas and W. Wyandottes were all young birds, and the W. Leghorns, with one exception, were old birds.

The pens were made up as follows:—

No. 1. 10 B. P. Rock hens.

No. 2. 7 B. Minorca hens.

No. 3. 6 W. Leghorn hens.

No. 4. 2 W. Wyandotte hens.

During the winter they were fed on a warm corn meal and shorts mash in the morning, and whole grain in the afternoon scattered on the floor of the pens. Water was before them all the time, and green ground bones and oyster shells were occasionally given them.

The eggs laid during the year by the different breeds were as follows:—

B. P. Rocks	450
B. Minorcas	400
W. Leghorns	268
W. Wyandottes	74

A 120-egg incubator was purchased from the T. A. Willetts Co., of Toronto, Ont., and one hatch taken off in May. One hundred and twenty eggs were put in.

At the end of 10 days, 38 eggs were found unfertile, and 64 chickens were hatched from the remaining 82 eggs. The chicks were very healthy, and none died.

The fowls now on hand are:—

	Cocks.	Cockerels.	Hens.	Pullets.
B. P. Rocks	1	4	5	5
B. Minorcas	1	..	4	1
W. Leghorns	1	3	5	7
W. Wyandottes	1	..	2	2

BEES

On December 5, 1900, four colonies of bees, weighing respectively 56½, 53, 52 and 44 pounds were put in winter quarters.

They were kept at a temperature ranging from 32° to 40° all winter, and put on their summer stands on April 17, 1901. The three swarming colonies then weighed 45, 40 and 40 pounds respectively, the other colony having died during the winter.

Although this season seemed to be favourable, the bees neither gave off many swarms, nor made much honey. One swarm was captured on July 2. They were put in their winter quarters this year on the 28th November, weighing 64, 60, 56 and 56 pounds respectively. No honey was taken from them this season.

I have the honour to be, sir,

Your obedient servant,

R. ROBERTSON,

Superintendent.

REPORT OF THE HORTICULTURIST.

(W. S. BLAIR.)

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith a report of some of the work done in the horticultural department of the Experimental Farm for the maritime provinces for the year 1901.

The spring opened up very early, making it possible to cultivate in parts of the orchard on the 19th of April. In May the temperature was moderate with but one frost on the 2nd of 6°. The average highest and lowest temperatures for the months of May, June, July, August and September for this year, as compared with 1900, are as follows:—

	Maximum.		Minimum.	
	1900.	1901.	1900.	1901.
May	55·9°	55·3°	36·3°	40·9°
June	68·°	69·8°	46·1°	48·9°
July	75·°	76·4°	54·°	54·1°
August	71 8°	75·7°	52·4°	54·9°
September	65·4°	68·2°	41·4°	43·7°

It will be seen that the season throughout has been decidedly warmer than last year. The temperature, especially for the month of September, continued uniformly high, and the season continued mild well along into October; the first frost occurring on October 8 of 1°, and the next October 22 of 10°.

The season, however, was extremely dry, but this did not injure the fruit crop with the exception of the raspberries and blackberries, which were almost a total failure. The apple trees made splendid growth and produced a medium crop of good fruit. The season has been noted for producing apples, the greater proportion of which were marketable. The apple scab was not so prevalent as usual, and the fruit that set matured in fine form.

The crop of apples is reported very light in many places. This seems to be the case especially where the trees have not been given proper attention in the past. I have noticed that orchards which have received good care gave a fair crop of fruit, while those adjoining which had received but little attention were without fruit at all. It is also said that in the Cornwallis and Annapolis valleys those who have paid particular attention to cultivating and fertilizing their orchards do not complain of the

season's fruit yield, while some whose orchards have been neglected are having but poor crops.

The Bordeaux mixture was used this year at the Nappan farm on all fruit trees. The apple scab fungus was more easily kept in check than usual, the weather continuing without any heavy rains made a less number of sprayings efficient. The plum aphis was the most troublesome pest to deal with. The most thorough work is necessary to kill all these insects, and several sprayings were required to rid the trees of this aphis. Tobacco water proves the cheapest and most effective material tried. The apple aphis, or apple plant louse, was also noticed on some apple trees, but only in small numbers.

The crop of cherries was very small, and outside of an English Morello and a few Orel trees no fruit was obtained. A few of the pear trees ripened fruit. The variety known as Osband's Summer gave some good specimens. The plum crop was very good. The plums which fruited well were Prince's Yellow Gage, Moore's Arctic, Saunders, Washington, Imperial Gage, German Prune and Italian Prune. The yield of strawberries was above the average.

The collection of annual flowering plants did not produce as fine bloom as usual owing to the dry weather. The perennial sorts gave splendid bloom. The ornamental trees and shrubs made good growth, and a report is here made of the varieties now growing at Nappan.

Experiments were conducted with vegetables of various kinds, and particulars of some of the tests will be found in this report.

I beg to acknowledge the following donations:—

Mr. A. M. Shaw, Stewiacke, N.S., cherry trees.

Mr. Leander Freen, Upper Malagash, N.S., cherry trees and Stark apple scions.

Peter Henderson & Co., New York, Prosperity peas and Metropolitan corn.

G. H. Haszard, Charlottetown, P.E.I., Cactus dahlias and King Edward VII. peas.

ORNAMENTAL TREES AND SHRUBS.

The ornamental trees and shrubs planted from time to time have made good growth during the past season. A list of those varieties now growing, the date of planting, their present growth, and the character of their growth is given in the following table.

There are 201 different sorts of deciduous trees and shrubs, and 56 kinds of evergreen trees and shrubs now growing on the farm. As far as possible the common names of these shrubs and trees are given, together with their botanical names. The botanical and common names used in the published catalogue of ornamental trees and shrubs growing at the Central Experimental Farm at Ottawa are used in this list.

Name of Variety.	When planted.	Present height.	Diameter of head.	Character of growth.	Remarks.
Deciduous.		Feet.	Feet.		
1 Acer platanoides—*Norway Maple*	1893	20½	11	Strong..	Fine ornamental tree.
2 Acer platanoides Schwedleri—*Schwedler's Maple*	1897	9	5	" ..	Very fine.
3 Acer Saccharinum—*Sugar or Rock Maple*	1892	13	7½	" ..	Valuable ornamental tree.
4 Acer Negundo—*Box Elder*	1892	13	10½	" ..	A fine rapid grower.
5 Acer tataricum Ginnala—*Ginnalian Maple*	1892	9	8	" ..	Valuable shrub when young.
6 Acer pseudoplatanus—*Sycamore Maple*	1897	5½	4½	Fair....	Not thrifty.

Name of Variety.	When planted.	Present height.	Diameter of head.	Character of growth.	Remarks.
7 Acer pennsylvanicum—*Striped Maple*	1899	5½	4	Strong..	Very good.
8 Acer platanoides Reitenbachi	1887	9½	5½	" ..	"
9 Acer pseudo-platanus Worleei	1897	6	5	Fair....	"
10 Acer Monspessulanum—*Montpellier Maple*	1897	3½	4	" ..	A low growing maple.
11 Æsculus turbinata—*Variegated Horse Chestnut*	1900	1	......	" ..	
12 Alnus glutinosa imperialis—*Imperial Cut-leaved Alder*	1897	8	7	Strong..	Top kills back in winter.
13 Alnus cordifolia—*Heart-leaved Alder*	1899	4	4	Fair....	" "
14 Aristolochia Sipho—*Dutchman's Pipe*	1899	1½	......	" ..	Makes strong growth.
15 Artemisia abrotanum—*Southernwood*	1894	4	5½	Strong..	A useful shrub.
16 Berberis Thunbergi—*Thunberg's Barberry*	1893	4	5½	" ..	Fine dwarf Barberry.
17 Berberis Aquifolium—*American Holly*	1897	2	3½	" ..	Very fine.
18 Berberis Sieboldii—*Siebold's Barberry*	1897	3	3½	" ..	"
19 Berberis Amurensis—*Amur Barberry*	1898	3	3¼	" ..	Fair.
20 Berberis Hybrid No. 2	1899	2¾	2½	" ..	Rapid grower.
21 Berberis Spathulata	1900	1	......	" ..	
22 Betula alba—*European White Birch*	1900	27	16	" ..	Fine ornamental tree.
23 Betula alba pendula Youngi—*Young's Weeping Birch*	1899	4½	4	" ..	Very fine.
24 Betula alba purpurea—*Purple-leaved Birch*	1897	10½	6½	" ..	"
25 Betula pumila—*Low Birch*	1901	1½	2	" ..	
26 Betula alba fastigiata—*Pyramidal Birch*	1897	15	6	" ..	A valuable variety.
27 Betula alba laciniata pendula—*Cut-leaved Birch*	1899	4½	3	" ..	Very fine.
28 Calycanthus floridus—*Carolina Allspice*	1899	2	1½	Fair....	Very good.
29 Caragana arborescens—*Siberian Pea Tree*	1891	7	8	Strong..	Very good, in full bloom June 10.
30 Caragana pygmæa—*Dwarf Caragana*	1898	2½	2½	" ..	Very good.
31 Caragana frutescens—*Woody Caragana*	1897	4	3	" ..	A fine variety.
32 Carpinus Caroliniana—*Blue Beech*	1899	1½	1	Weak..	
33 Catalpa Cordifolia	1900	3	1½	Strong.	Kills back.
34 Catalpa Kaempferi	1901	2	1	" ..	"
35 Celastrus Articulatus—*Japanese Bitter-sweet*	1899	5½	4½	" ..	Climber.
36 Celastrus Scandens—*Climbing Bitter-sweet*	1899	5½	3	" ..	"
37 Cephalanthus occidentalis—*Button Bush*	1898	2	2	Weak..	
38 Cercidiphyllum Japonicum—*Katsura Tree*	1897	2¾	2	Fair....	Very fine.
39 Clematis Vitalba—*Common Traveller's Joy*	1899	8	......	Strong..	Good climber.
40 Clematis Viticella	1899	6½	......	" ..	"
41 Clematis Montana—*Mountain Clematis*	1900	10	......	" ..	"
42 Cornus sanguinea—*Red-branched Dogwood*	1898	3½	4	" ..	Very good.
43 Cornus alba sibirica variegata—*Variegated Dogwood.*	1898	3	3½	" ..	Very fine.
44 Cornus Baileyi	1897	5½	5	" ..	"
45 Cornus Amomum	1897	3½	4	" ..	
46 Cornus Spaethii	1899	1½	1	Fair....	
47 Cornus Mascula Variegata—*Variegated Cornelian Cherry*	1899	1½	½	Weak..	
48 Cornus sanguinea elegantissima	1899	1½	1	Fair....	
49 Cotoneaster tomentosa—*Common Cotoneaster*	1898	3	5	Strong..	Very good.
50 Cotoneaster Acutifolia—*Sharp-leaved Cotoneaster*	1895	3	4	" ..	"
51 Cotoneaster laxiflora	1899	3½	5	" ..	Very fine.
52 Crataegus tomentosa—*Black Haw*	1897	3	4	" ..	"
53 Crataegus Oxyacantha flore rubro pleno—*Double red-flowering White Thorn*	1899	2½	1½	Fair....	"
54 Cytisus purpureus	1897	1½	2	Strong..	Full bloom June 15.
55 Cytisus triflorus	1898	1	3	" ..	Very fine.
56 Daphne Mezereum	1901	½	....	Weak..	
57 Deutzia hybrida Wellsii	1894	2½	2½	Fair....	Full bloom July 12.
58 Deutzia gracilis variegata	1898	1½	1½	Weak..	
59 Deutzia gracilis	1899	1	1	" ..	
60 Diervilla hortensis A. Carrière	1897	4	4½	Strong..	Winter kills slightly.
61 Diervilla florida Stelzneri	1897	4	4	" ..	"
62 Diervilla Candida—*Weigela Candida*	1898	4	5	" ..	"
63 Diervilla florida—*Weigela Rosca*	1894	4½	5	" ..	"
64 Diervilla florida alba—*Weigela Rosea Alba*	1892	4½	5	" ..	Winter kills slightly.
65 Diervilla hybrida Aurea—*Weigela Aurea*	1894	1½	1½	Fair....	Winter kills badly.
66 Elaeagnus Argentea—*Wolf Willow*	1899	3½	2	Strong..	Valuable.
67 Euonymus Americanus—*Spindle Tree*	1897	4	2	" ..	Valuable.

Name of Variety.	When planted.	Present height.	Diameter of head.	Character of growth.	Remarks.
		Feet.	Feet.		
68 Forsythia suspensa—*Golden Bell*	1899	3	3½	Fair	Very fine.
69 Forsythia variegata—*Variegated Golden Bell*	1899	2½	2	"	"
70 Fraxinus Americana—*White Ash*	1890	24	18	Strong	Valuable tree.
71 Genista tinctoria Sibirica—*Siberian Green-weed*	1899	1	2½	"	Very fine.
72 Gleditschia triacanthos—*Honey Locust*	1898	3	3	"	"
73 Hamamelis Virginica—*Witch Hazel*	1901	2½	2	Fair	Valuable.
74 Hippophæ rhamnoides—*Sea Buckthorn*	1899	2	1½	"	Very fine.
75 Hydrangea paniculata	1897	5	5	Strong	"
76 Juglans cinerea—*Butternut*	1890	12	8	"	Valuable tree.
77 Juglans Sieboldiana—*Japanese Walnut*	1898	5	1	Weak	
78 Ligustrum Amurense—*Amur Privet*	1895	5	5	Strong	Fine shrub.
79 Ligustrum vulgare aureum—*Golden Privet*	1899	1½	1½	"	Very fine.
80 Ligustrum Ibota	1897	4½	4	"	Bloom July 20.
81 Ligustrum sinense	1897	4½	4	"	Very fine.
82 Ligustrum ovalifolium variegata—*Variegated California Privet*	1897	3½	3	Fair	"
83 Liriodendron tulipifera—*Tulip Tree*	1897	4	3	Strong	Kills back, slightly.
84 Lonicera Chrysantha—*Amur Bush Honeysuckle*	1892	10	7	"	Very good.
85 Lonicera tatarica flore rubro—*Tartarian Bush Honeysuckle*	1894	7	8	"	"
86 Lonicera Alberti—*Albert Regel's Honeysuckle*	1898	2	3½	"	Very fine.
87 Lonicera hirsuta—*Hairy Honeysuckle*	1901	1	......	"	
88 Lonicera cærulea graciliflora	1899	3½	3	"	Very good.
89 Lonicera Periclymenum—*English Honeysuckle*	1899	5	...	"	Good climber.
90 Lycium Chinense—*Matrimony Vine*	1899	3	1½	"	Very fine.
91 Menispermum dauricum—*Moonseed*	1898	5	......	"	Climber.
92 Periploca græca	1900	2	......	"	"
93 Philadelphus hybridus Lemoinei—*Mock Orange*	1898	2	2	"	Very fine.
94 Philadelphus nivalis spectabilis plenus	1899	1	1	Fair	
95 Philadelphus inodorus speciosus grandiflorus	1897	5	4½	Strong	Bloom July, very fine.
96 Philadelphus hybridus Lemoinei—*Boule d'Argent*	1900	1½	1	Fair	
97 Philadelphus Dentziæflorus	1898	2	1½	Strong	Very fine.
98 Philadelphus coronarius	1897	4	4	"	"
99 Philadelphus grandiflorus—*Large-flowered Mock Orange*	1898	2½	2½	Fair	"
100 Philadelphus hirsutus	1899	1½	1	"	
101 Philadelphus Keteleerii flore pleno	1901	½	......	"	
102 Philadelphus cordifolius	1900	1	1	"	
103 Philadelphus nivalis	1899	1	1½	"	
104 Populus alba pyramidalis—*Silver Poplar*	1891	20	6	Strong	Very fine.
105 Populus certinensis	1890	38½	18	"	Very rapid growth.
106 Populus nigra pyramidalis—*Lombardy Poplar*	1891	37	8½	"	Valuable tree.
107 Populus deltoidea aurea—*Van Geert's Poplar*	1899	3½	2	"	Very fine.
108 Potentilla fruticosa—*Shrubby Cinque-foil*	1897	4	5	Strong	Very good.
109 Prunus pissardi—*Purple-leaved Plum*	1897	5½	5	"	Very fine.
110 Prunus Japonica flore roseo pleno	1897	3½	2½	"	
111 Prunus demissa—*Western Wild Cherry*	1900	4½	2½	"	
112 Prunus Simonii	1897	3	2	Fair	
113 Prunus Maritima—*Beach Plum*	1901	1½	2	Strong	Very fine.
114 Prunus Pumila—*Sand Cherry*	1899	2	2½	"	
115 Prunus Maximowiczii	1899	3½	2	"	
116 Ptelea trifoliata aurea—*Golden Wafer Ash*	1897	4	5	"	Very fine.
117 Pyrus Aucuparia—*European Mountain Ash*	1892	20	10	"	Valuable tree.
118 Pyrus Sorbus—*Service Tree*	1897	6½	3	"	Very fine.
119 Pyrus Japonica rosea alba—*Japanese Quince*	1898	3	2½	Fair	"
120 Pyrus sinensis	1900	3½	3	Strong	
121 Pyrus Maulei—*Maule's Japanese Quince*	1899	2	2	"	"
122 Prunus Serotina—*Wild Black Cherry*	1898	5½	5½	"	Very good.
123 Quercus Coccinea—*Scarlet Oak*	1897	8	4	"	Very fine.
124 Quercus pedunculata—*European Oak*	1892	20	12	"	"
125 Japan Oak	1899	2	1½	"	
126 Rhamnus tinctoria—*Buckthorn*	1897	5½	3	"	Valuable tree.
127 Rhamnus Cathartica—*Common Buckthorn*	1897	6	5	"	"
128 Rhus Cotinus—*Smoke Tree*	1898	2½	3	"	Very fine.
129 Rhus Coriaria—*Staghorn Sumach*	1897	8	5½	"	"
130 Rhus Cotinus atropurpurea	1899	1½	1	"	"

Name of Variety.	When planted.	Present height.	Diameter of head.	Character of growth.	Remarks.
		Feet.	Feet.		
131 Ribes aureum—*Missouri Currant*	1892	7½	7	Strong..	Full bloom June 5.
132 Ribes diacantha—*Siberian Currant*	1897	4	2½	" ..	Valuable.
133 Ribes aureum tenuiflorum	1898	3	3	" ..	"
134 Ribes gordonianum	1900	1½	1	" ..	
135 Robinia hispida—*Rose Acacia*	1898	3	3½	" ..	Full bloom June 15,
136 Rosa rubiginosa—*Sweetbriar*	1901	1½	1	" ..	Valuable.
137 Rosa rugosa—*Japanese Rose*	1897	3	3½	" ..	Very fine.
138 Rosa ferruginea—*Purple-leaved Rose*	1897	6	5	" ..	Very good.
139 Rosa centifolia—*Cabbage or Provence Rose*	1893	3	4	" ..	"
140 Salix alba argentea—*Silvered White Willow*	1898	5	4½	" ..	
141 Salix aurea pendula	1900	6	5	" ..	Very fine.
142 Salix rosmarinifolia—*Rosemary-leaved Willow*	1898	5	4½	" ..	
143 Salix Voronesh—*Voronesh Willow*	1900	6	5	" ..	Valuable.
144 Sambucus nigra pyramidalis—*Pyramidal Elder*	1897	4	2	" ..	
145 Sambucus nigra foliis aureis—*Golden-leaved Elder*	1897	4	4	" ..	Very fine.
146 Sambucus nigra laciniata—*Cut-leaved Elder*	1897	5½	5	" ..	Very good.
147 Sambucus nigra pulverulenta alba	1897	3½	3½	" ..	
148 Sambucus nigra fol. argenteis variegatis	1897	2½	3	" ..	Very fine.
149 Sambucus nigra fol. aureis variegatis—*Golden Elder.*	1897	3	4½	" ..	"
150 Sophora Japonica	1897	6	5	" ..	"
151 Spiræa arguta	1899	4½	4	" ..	Very fine,.
152 Spiræa callosa alba	1894	2¾	4	" ..	Very fine.
153 Spiræa vaccinifolia—*Vaccinium-leaved Spiræa*	1899	4½	2½	Fair....	Valuable.
154 Spiræa Chamædrifolia—*Germander-leaved Spiræa.*	1897	4	3	Strong..	"
155 Spiræa callosa rosea	1898	3	2½	" ..	"
156 Spiræa sorbifolia	1897	2½	2½	" ..	Bloom July 20.
157 Spiræa Van Houttei—*Van Houtte's Spiræa*	1894	5½	5½	" ..	Very fine.
158 Spiræa discolor—*White-beam-leaved-Spiræa*	1897	5½	5½	" ..	Valuable.
159 Spiræa salicifolia floribus alba—*Meadow Sweet*	1897	5½	3¾	" ..	"
160 Spiræa Thunbergi—*Thunberg's Spiræa*	1897	3½	3½	" ..	Very fine.
161 Spiræa salicifolia floribus rosea—*Red-Meadow Sweet*	1897	5½	4	" ..	Valuable.
162 Spiræa callosa macrophylla	1897	5	4	Strong..	Full bloom July 15.
163 Spiræa callosa superba	1898	2	2½	" ..	Very good.
164 Spiræa japonica Bumalda—*Spirææ Bumalda*	1898	2½	2	" ..	Valuable.
165 Spiræa japonica alba—*White Japanese Spiræa*	1901	1½	1	Fair....	"
166 Spiræa bracteata aurea	1899	1½	1	" ...	Very fine.
167 Spiræa douglasi	1892	5	5	Strong..	
168 Spiræa notha	1897	4½	4	" ..	
169 Spiræa notha aurea—*Golden-leaved Spiræa*	1897	4½	4½	" ..	Very fine.
170 Spiræa japonica rubra—*Red Japanese Spiræa*	1892	2	2	Fair....	Valuable.
171 Syringa villosa	1897	6½	5	Strong..	Very fine.
172 Syringa japonica—*Japan Lilac*	1897	6	4½	" ..	"
173 Syringa josikæa—*Josika's Lilac*	1894	7½	7	" ..	Full bloom June 20.
174 Syringa vulgaris purpurea—*Common Purple Lilac.*	1892	7	7	" ..	" " 8
175 Syringa vulgaris alba—*White Lilac*	1894	8	5	" ..	Very fine.
176 Syringa vulgaris Beranger	1897	3½	2	Fair....	"
177 Syringa vulgaris cœrulea superba	1897	3	2	" ...	"
178 Syringa persica laciniata—*Cut-leaved Persian Lilac*	1897	2½	2½	" ...	"
179 Syringa vulgaris nigricans	1897	3½	2½	" ..	Valuable.
180 Syringa vulgaris congo	1901	¾	.....	" ...	
181 Syringa vulgaris Gloire de Croncells	1897	3	2½	" ...	
182 Syringa vulgaris rubra insignis	1897	4	2½	Strong..	
183 Syringa vulgaris rubra plena	......	.....	.....	....	
184 Syringa vulgaris President Grevy	1901	½	.....	Fair.. .	
185 Syringa persica—*Persian Lilac*	1897	3½	3½	Strong..	"
186 Syringa vulgaris Marie Legraye	1901	½	.....	" ..	
187 Syringa vulgaris Rouge de Marley	1897	3½	3	" ..	Very fine.
188 Syringa vulgaris Mathieu de Dombasle	1897	2½	2	Weak ..	
189 Syringa vulgaris Lemoinei	1901	½	.....	" ...	
190 Syringa vulgaris Madame Lemoine	1901	½	.....	" ...	
191 Syringa vulgaris Chas. X	1899	2½	2	Strong..	"
192 Tamarix amurensis—*Amur Tamarisk*	1897	6½	3½	" ..	Winter kills a little.
193 Tilia platyphyllos—*Broad-leaved Linden*	1892	10	12	" ..	Very fine.
194 Ulmus Americana—*American Elm*	1891	16	12	" ..	Valuable tree.
195 Ulmus racemosa—*Cork or Rock Elm*	1894	6	3½	" ..	Valuable.

Name of Variety.	When planted.	Present height.	Diameter of head.	Character of growth.	Remarks.
		Feet.	Feet.		
196 Viburnum opulus—*High Bush Cranberry*	1891	6½	5½	Strong..	Very fine.
197 Viburnum opulus sterile—*Snow-ball*	1898	5	4½	" ..	"
198 Viburnum Lantana—*Wayfaring Tree*	1894	8	6¾	" ..	Valuable.
199 Viburnum prunifolium—*Black Haw*	1899	2½	2	Fair....	"
200 Vitis quinquefolia—*Virginia Creeper*	1892	......	......	Strong..	Best climber.
201 Vitis Thunbergii	1899	2½	.. ...	Weak ..	Kills back.
Conifers.					
1 Abies subalpina	1901	1½	1	Fair....	
2 Abies balsamea—*Balsam Fir*	1893	6½	6	Strong..	
3 Abies concolor—*One Coloured Fir*	1901	3	3	" ..	Very fine.
4 Cupressus Lawsoniana—*Lawson's Cypress*	1897	2½	4½	" ..	Very good.
5 Cupressus pisifera—*Retinospora pisifera*	1897	3½	5	" ..	Very fine.
6 Cupressus pisifera aurea—*Golden Retinospora*	1892	4	4½	" ..	"
7 Cupressus pisifera filifera—*Retinospora filifera*	1894	4	5½	" ..	"
8 Cupressus pisifera plumosa—*Plumose Retinospora.*	1893	6	4½	" ..	"
9 Cupressus pisifera plumosa aurea—*Golden Plumose Retinospora*	1898	3	2½	" ..	"
10 Retinospora Leptoclada	1899	1½	1	Fair....	
11 Cupressus obtusa viridis—*Green obtuse Cypress*	1899	1	½	Weak ..	
12 Juniperus chinensis—*Chinese Juniper*	1898	2½	2	Fair....	"
13 Juniperus communis suecica—*Swedish Juniper*	1898	3½	2½	Strong..	"
14 Juniperus sabina—*Common Savin Juniper*	1897	1½	4	" ..	"
15 Juniperus communis—*Common Juniper*	1894	5	4½	" ..	"
16 Juniperus elegans—*Elegant Virginian Juniper*	1898	3½	3	" ..	"
17 Juniperus sinensis variegata—*Variegated Savin.*	1899	1	½	" ..	"
18 Juniperus communis aurea—*Golden Juniper*	1899	1	½	Weak ..	
19 Juniperus chinensis aurea — *Golden Chinese Juniper*	1899	1	½	" ..	
20 Juniperus Virginiana—*Red Cedar*	1891	8	5	Strong..	"
21 Larix Europaea—*European Larch.*	1890	27	16	" ..	
22 Picea alba—*White Spruce*	1894	7½	6	" ..	
23 Picea excelsa—*Norway Spruce*	1893	20½	11	" ..	
24 Picea nigra—*Black Spruce*	1895	8	6½	" ..	
25 Picea pungens—*Rocky Mountain Blue Spruce*	1892	13	8	" ..	"
26 Picea obovata schrenkiana	1900	1	......	Fair....	
27 Picea alba variegata Aurea—*Golden White Spruce.*	1901	1	. .. .	"	
28 Picea Parryana glauca	1900	1	......	"	
29 Picea alba variegata	1900	1	......	"	
30 Picea alba pyramidalis	1899	1	½	Strong..	"
31 Picea excelsa Remontii	1899	1½	1	" ..	"
32 Picea alcockiana—*Alcock's Spruce*	1900	1	1½	" ..	"
33 Pinus Cembra—*Stone Pine*	1896	4½	3	" ..	"
34 Pinus montana Mughus—*Dwarf Mountain Pine.*	1892	4½	6	Strong..	Very fine.
35 Pinus ponderosa—*Heavy Wooded Pine*	1899	2½	2	Fair....	
36 Pinus Strobus—*White Pine*	1892	10	6½	Strong..	"
37 Pinus sylvestris—*Scotch Pine*	1890	20	13	" ..	Valuable tree.
38 Pinus Laricio nigricans—*Austrian Pine*	1894	11	9	" ..	"
39 Pseudotsuga Douglasii—*Douglas' Spruce*	1898	5½	4	" ..	Very fine.
40 Taxodium distichum—*Bald Cypress*	1897	2	3½	" ..	"
41 Thuya occidentalis—*White Cedar, Arbor-vitae*	1893	10	7	" ..	Valuable.
42 Thuya occid. variegata—*Variegated Arbor-vitae*	1899	2	1	" ..	Very fine.
43 Thuya occid. pyramidalis—*Pyramidal Arbor-vitae.*	1897	5½	2	" ..	"
44 Thuya occid. compacta—*Compact Arbor-vitae*	1894	4½	5½	" ..	"
45 Thuya occidentalis globosa—*Globose Arbor-vitae*	1897	2½	2	" ..	"
46 Thuya occidentalis Hoveii—*Hovey's Arbor-vitae*	1897	3	2½	" ..	"
47 Thuya ericoides	1898	3	3	" ..	"
48 Thuya occidentalis pumila	1898	2	2	" ..	
49 Thuya occid. elwangeriana—*Elwanger's Arbor-vitae*	1897	3	4	" ..	"
50 Thuya occidentalis vervaenana	1897	3½	3	" ..	"
51 Thuya occidentalis Hoveii aurea—*Hovey's Golden Arbor-vitae*	1898	2	1½	" ..	"
52 Thuya occidentalis Meehani aurea—*Meehan's Golden Arbor-vitae*	1898	2	2	Fair....	"
53 Thuya occidentalis lutea—*Yellow Arbor-vitae*	1899	¾	....	"	"
54 Thuya occidentalis pygmaea	1899	½	....	" . . .	
55 Thuya occidentalis Columbia	1900	1	......	"	
56 Tsuga canadensis—*Hemlock*	1892	4	6	Strong..	"

STRAWBERRIES.

Experiments were conducted this season with 41 varieties of strawberries. The plots were each 99 square feet. The plants for each plot were set in the spring of 1900 in two rows, each 3 feet apart and 16½ feet long. They were set one foot apart in the rows. A space of 5 feet was left between the plots when planted so that when the runners were formed each plot was 6 feet wide and 16½ feet long of matted plants with a good space between each plot which was kept cultivated.

We seldom take more than one crop off the plants grown in the matted row system. This season, however, the fruit was picked from those plots planted in the spring of 1899. The yield, however, was not large. It was found impossible to keep the weeds out of these older plots without much extra labour, and it was thought that the fruit would not warrant the outlay, consequently the plots were allowed to remain weedy. The berries picked were small, and the yield on many did not much more than pay for the expense of picking. Some, however, yielded a fair amount of good fruit. There was no expense incurred in this instance, except that of covering the plants during winter. It seldom pays to put expense in the way of labour and fertilizers on old plots, but it is often advisable where plenty of land is available to let the plants remain for the second crop.

The land on which the main crop was grown was a clay loam, and was manured in the fall of 1899 with 20 tons of stable manure per acre. This was ploughed under in the fall, and in the spring of 1900 was worked up and complete fertilizer at the rate of 400 pounds per acre sown broadcast and harrowed in. The plants were set on the level, May 17.

The usual straw protection was not given the plants in November, and a heavy snowstorm the 5th of December covered the plants completely. This remained on until the last of March when it was thought advisable to give a light covering of straw to the new plots, but the old beds were allowed to go without protection and all came through in good condition. Notes taken on this point from year to year would indicate that only in one winter in three will the plants stand the winter without protection, and hence it is not safe to allow the plants to go without such protection.

The dates of picking and quantity of fruit obtained each day are given in the following table. The dates of picking and yield obtained from the old plots are also given. Several new varieties received from the Central Experimental Farm were added to the list this year, including Afton, P.; Nick Ohmer, B.; Clyde, B.; Senator Dunlap, B.; Glen Mary, B., and Buster, P.

STRAWBERRIES—TEST OF VARIETIES.

Name of Variety.	Sex.	Date of Picking—July.												Total Yield from plot of 99 sq. ft.	
		3rd.		6th.		9th.		12th.		15th.		20th.			
		Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.
Bisel	P	1	4	4	4	11	8	13		7	15	2	1	40	
Beverly	B	2	12	5		4	2	14	1	6	5	1		33	4
Barton's	P	3	2	6	14	6		9	4	4	12	2	2	32	2
Beder Wood	B	6		4	3	10	13	9		2	2	2	1	34	3
Brandywine	B	1		1	2	3	14	4	2	2	7	3	9	16	2
Bubach	P	9	1	9	15	11		6	2	3	6	....		39	8
Capt. Jack	B	6	1	8		5	11	4		7	8	1		32	4
Chairs	B		8	2		2	7	4	9	3	8	4	1	17	1
Crescent	P	4		8	1	5	15	7	6	5	1	1	9	32	
Enhance	B		4	3	2	3	4	7	2	6		4	1	23	13
Equinox	B	....		2		1	12	2		4	12	2		12	8
Eureka	P	....		2	1	3	7	13		5	2	1	14	25	8
H. W. Beecher	B	3	1	4	13	12	2	4		5	8	2		31	8
Haverland	P	5		4	7	9	9	7	1	7	1	1	8	34	10
Jas. Vick	B	1		5	2	9	14	9	6	4	6	4	12	34	8
John Little	B	4	1	3	7	6	9	3	15	8	2	2		28	2
Lovett	B	6	2	5	12	13	2	6		4		1		36	
Otsego	P		4	2	10	4	2	10		5	2	5	15	28	1
Paris King	B	5	5	4	11	4		1	8	2			4	17	12
Pearl	P	4	2	6	12	5	2	5	8	3	4	....		24	12
Parker Earle	P	4		3	2	7	14	7		3	2	5	15	31	1
Princess	B	7	8	6	8	7	2	4	12	3	2	1		30	
Shirts	B		4	1	8	4		3	7	6	9	1	2	16	14
Sharpless	B		12	3	8	4	6	6	8	2	2	1		18	4
Swindle	B		4	1		4	6	9	5	6	8	7	5	28	12
Seneca Queen	B		8	3		7	5	9	11	5	8	1		27	
Thompson's Late	P	9	8	4		1	6	....		....		....		14	14
Wm. Belt	B	....		....		8	2	8	1	4	5	5	4	25	12
Warfield No. 2	P	4		8	5	13	5	12	6	4	8	5		47	8
Wilson	B	3	2	4	12	8	2	6	8	7		1	12	31	4
Williams	B	2		2		8	5	4	11	2	8	1		20	8
Tennessee Prolific	B	2	2	7	12	4	12	9	8	6		1	8	31	10
Jessie	B	1		1		4	3	7	2	2	8	2	4	18	1
Ada	P	3	5	5	2	3	1	4	8	3		1		20	
Greenville	P	1	3	5	5	15	8	10		6	2	3	14	42	
Gandy	B	2		5	3	9	13	5	8	3		2	4	27	12
Cossett	P		12	5	8	4	3	3	9	3	9	.....		17	9
Mary	P	1		2	12	5	2	4	6	1	12	2	8	17	8
Saunders	B	2		1	4	7	12	14	8	7		3		35	8
1001	B	2	2	1	10	4		4	8	4		6		22	4

STRAWBERRIES—TEST OF VARIETIES.

OLD PLOTS.

Name of Variety.	Date of Picking—July.										Total Yield from Plot.	
	2nd.		4th.		7th.		12th.		15th.			
	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.	Lbs.	oz.
Brandywine		8	1	4	2	3	....		1	2	5	1
Bisel	1	2	2	12	7	6	8	3	....		19	7
Beverly		4	2	3	4	2	7	8	....		14	1
Beder Wood	1		2	8	5	2	5	1	1	6	15	1
Barton's	1	8	3	5	6	2	4	7	1		16	6
Bubach	2	2	4	7	4	11	3	6	....		14	10
Capt. Jack	1	8	1	3	2	12	1	9	1	8	8	8
Clark's Early	1	8	1	8	1	2	1	5	....		5	7
Chairs	1	4	1		1	8	1	4	....		5	
Crescent	3		2	7	7	4	1	6	....		14	1
Enhance		8	1	4	1	8	....		....		3	4
Eureka	....		....		2	4	3	7	....		5	11
Equinox	....		....		....		1	4	2	6	3	10
Gandy	....		1	12	4		2	8	1	4	9	8
Greenville		12	1	4	4	12	3	14	....		10	10
H. W. Beecher	1	8	1	7	4	14	5	2	....		12	15
Haverland	2	1	2	3	4	6	3	1	2		13	11
Jas. Vick		12	2		6		5	8	1	2	15	6
John Little	1	8		8	2	3	....		1		5	3
Lovett	2		1	5	3	7	....		....		6	12
Otsego		4	1		7	7	6	3	....		14	14
Paris King	2	12	1		2		....		1	4	7	
Pearl	1		1	8	1	13	1	4	....		5	9
Parker Earle	1	2	1	11	....		2	14	....		5	11
Shirts	....		....		1	15	2	6	....		4	5
Sharpless	2	4	2	1	4	11	4	2	1	8	14	10
Swindle		4	3	11	2	5	2		....		10	10
Seneca Queen	1		1		4	8	4	2	....		10	10
Wm. Belt		2	1	11	2	14	5	7	1	2	11	4
Warfield	3	12	3		2	7	4	2	....		13	5
Wilson	1		3	7	2	12	1	2	....		8	5
Williams	1	8	2		2	14	2	4	1	8	10	2
Tennessee Prolific		8	2		1	8	1	6	....		5	6

GOOSEBERRIES.

The gooseberries have never made a strong growth, especially the English varieties. The soil is a heavy clay loam which dries out considerably in the summer. The gooseberry mildew which we have been able heretofore to control fairly well has this season been almost impossible to keep in check. The crop of all the English varieties, except Whitesmith and Industry, was ruined, and the yield of fruit was not large.

The English varieties of gooseberries while much larger than the American sorts are not regarded here as of much better quality, and the latter are much more vigorous here. The Red Jacket is an exceptionally fine variety. It together with Downing are two of the best sorts grown here. The Houghton is a large yielder, and the fruit is of good quality, but is small. The Whitesmith is the best of the fourteen varieties of English gooseberries tested. The common practice seems to be to pick this fruit long before it has commenced to ripen. Its quality for preserving is in our opinion greatly improved when allowed to partially ripen before picking.

EXPERIMENTS WITH GOOSEBERRIES.

Name of Variety.	Number of Plants.	Yield in 1900.	Number of Plants.	Yield in 1901.
		Lbs.		Lbs.
Smith's Improved	6	$13\frac{1}{2}$	6	$6\frac{3}{4}$
Downing	6	$15\frac{1}{2}$	6	$9\frac{1}{2}$
Houghton	6	17	6	$9\frac{3}{4}$
Red Jacket	6	$16\frac{1}{4}$	6	$5\frac{3}{4}$
Whitesmith	6	$14\frac{1}{2}$	6	$4\frac{3}{4}$
Industry	6	$12\frac{1}{2}$	6	$3\frac{1}{4}$

RED AND WHITE CURRANTS.

Eight varieties of red and two varieties of white currants fruited this season. They were grown in rows 6 feet apart and 5 feet apart in the rows. The soil on which they were grown was a heavy clay. The bushes are vigorous growers, and some of them were quite productive.

EXPERIMENTS WITH RED AND WHITE CURRANTS.

Name of Variety.	Number of Bushes.	Yield of Bushes.	Remarks.
		Lbs.	
North Star	3	$13\frac{3}{4}$	Small; fair quality.
Pomona	3	$8\frac{1}{2}$	Large "
Cherry	3	$6\frac{3}{4}$	Very large; fair quality.
Fay's Prolific	3	$6\frac{1}{2}$	" "
Red Dutch	3	$16\frac{1}{4}$	Small; fair quality.
Knight's Early Red	3	$2\frac{3}{4}$	" excellent quality.
La Fertile	3	5	" "
Wilder	3	$12\frac{1}{4}$	" fair quality.
White Dutch	3	$10\frac{1}{2}$	" "
White Imperial	3	$8\frac{3}{4}$	Large "

GRAPES.

Fourteen varieties of grapes fruited this year. These were planted in the spring of 1897 on a clay loam. They were set in a row six feet apart. The vines run on a trellis made of wire attached to posts. They have always been laid down for winter, with the exception of the past winter, when they were left unprotected and came through the season in good condition. They fruited for the first time this year.

EXPERIMENTS WITH GRAPES.

Name of Variety.	When Ripe.	Colour of Fruit.	Remarks.
Florence	Sept. 23	Black	Fair quality; vigorous.
Lady	Oct. 4	White	Good quality "
Moyre's Early	" 4	Black	Fair quality; fairly vigorous.
Moyer	" 4	Bright red	Good quality; vigorous.
Telegraph	" 4	Black	" fairly vigorous.
Lindley	" 10	Red	" vigorous.
Hayes	" 10	White	" "
Worden	" 10	Black	" fairly vigorous.
Barry	" 16	"	Poor quality; vigorous.
Bacchus	" 16	"	" "
Moore's Diamond	" 16	Greenish white	Good quality; vigorous.
Herbert	" 18	Black	" "
Vergennes	" 23	Bright red	Did not ripen; vigorous.
Roger's No. 17	" 23	Blue black	" "

RHUBARB.

Five varieties of rhubarb were grown in rows six feet apart each way. The soil was a heavy clay loam and the crop is not early on such ground. The advantage in favour of a light but loamy soil for this plant is very great, as the early crop generally realizes double the price that is obtained a few days later. The plants were manured in the fall with well rotted manure which was dug in around the plants as early in the spring as possible. We have found that August is the best time for dividing and resetting roots, which should be done every four or five years.

The variety, Carleton Club, is a very large growing variety, and should be more widely known. Mitchell's Royal Albert is also very large, but late. The yield obtained from four plants was as follows:—

Name of Variety.	When Pulled.	Yield from four Plants.
		Lbs.
Paragon	May 21	22
Linnaeus	" 21	32
Victoria	" 21	24
Carleton Club	" 27	46
Mitchell's Royal Albert	June 3	21

LIME WASH FOR THE OYSTER-SHELL BARK LOUSE.

This mixture was prepared by slacking fresh lime in water and adding more water to make it of the strength desired. One experiment was made with the mixture in the proportion of 1 pound of lime to 1 gallon of water, and another with 2 pounds of lime to 1 gallon of water. The trees treated in this experiment were young, only 2 years planted, which were badly covered with the bark louse. They were in a neighbouring orchard.

The wash made of 1 pound of lime to a gallon of water was not nearly so effective as the one where 2 pounds of lime was used. On the trees where the latter mixture was used the scales were over three-quarters killed. If this is used in the fall as advised by Mr. W. T. Macoun, horticulturist of the Central Farm, there is no doubt but

that it will be still more effective. It is a cheap and efficient remedy for this troublesome pest. The spraying was done March 26, and two sprayings were given each tree on that date.

The lime should be slacked with hot water, enough being used to well cover the lime. As soon as slacked pour in cold water and stir until the whole mass is thoroughly mixed. It will need to be strained through a wire sieve before using. The mixture should be kept agitated in the barrel, and a nozzle used which by reversing can be easily cleaned. This mixture, with the addition of 15 pounds of salt per barrel, makes a good whitewash for buildings, which work can be easily done with a spray pump.

KEROSENE EMULSION FOR THE OYSTER-SHELL BARK LOUSE.

An experiment to gain information as to the value of kerosene emulsion for destroying the young lice when they have just hatched on apple trees was made in a neighbour's orchard. The work was done on young trees two years planted, which were all badly covered with the insect. Three experiments were made with this emulsion, and five trees were treated in each case.

The emulsion was made by dissolving one-half pound of hard soap in 1 gallon of rain water which was brought to the boiling point when 2 gallons of kerosene was added and churned briskly through a pump when it was quickly formed into an emulsion. Experiment No. 1 was with this emulsion diluted with water in the proportion of 1 part of the oil used to 4 parts of water (not 1 part of the emulsion to 4 parts of water). Experiment No. 2 contained 1 part of oil to 6 parts of water, and Experiment No. 3, 1 part of oil to 9 parts of water.

While this mixture proved fairly effective, yet in every case the trees were not entirely freed of the young insect. The spraying was thoroughly done, and it seems strange that some of the trees were completely cleared while some had quite a few still remaining. By giving two sprayings, one about a week after the other, this remedy has been found quite effective.

The spraying was done July 4, and notes taken later in the season. The emulsion was put on during a bright day, and no noticeable damage was done to the leaves or bark by the mixture. During a bright day the oil evaporates more quickly, and hence perhaps is not so liable to injure the tree.

TOBACCO WATER FOR THE OYSTER-SHELL BARK LOUSE.

An experiment with tobacco water was also tried on five trees in the same orchard. The solution was made by soaking 15 pounds of tobacco stems in a barrel of water 24 hours, and the liquid was used as a spray. The trees were badly covered with the insects just hatched. The spraying was done July 4. It was found that this was of little value, and the notes subsequently taken would indicate that not more than 10 per cent of the hatched insects were killed.

GARDEN PEASE.

Experiments were conducted with 84 varieties of garden pease. The object being to determine the relative value of the different kinds for early, medium and late market crops. The seed was sown on April 27 in two plots each, one row 66 feet long. The rows were 4 feet apart and the seed was planted $1\frac{1}{2}$ inches deep and 2 inches apart. The marketable green pease with pods were pulled when fit for use, and the yield per plot obtained. The other plot was allowed to ripen, and the yield of ripened seed obtained.

The land on which these pease were grown was a clay loam, and was in potatoes the previous season. No barn-yard manure was used for the crop, but complete fertilizer at the rate of 100 pounds per acre was scattered along the rows before planting, and was worked in when covering the seed. The pea aphis did not trouble the crop this season.

Two new varieties were included in the test, namely, King Edward VII. and Prosperity. The former is an English variety and a large pea of excellent quality. It is a little earlier than American Wonder and Nott's Excelsior. Prosperity has a large pod and should prove a valuable market sort. The variety Gradus has not been a heavy cropper, but its quality is of the best. The varieties we would recommend, and which came in the order named for earliness are : Tom Thumb, Nott's Excelsior, American Wonder, Dwarf Telephone and Sutton's Dwarf Defiance, all dwarf varieties. Of half high sorts, Alaska, Ameer, Gradus, Carter's Up-to-Date, Duke of York, Profusion and Telegraph.

PEASE—TEST OF VARIETIES

Name of Variety.	Season of Green Peas.	Weight of Green Peas.	Height of Vine.	Length of Pod.	Size of Pea.	Yield of Ripe Seed.
		Lbs.	Inches.	Inches.		Lbs.
Gregory's Surprise	July 12 to 20	21	36	2¼ to 2¾	Medium	4¼
Station	" 12 to 20	24	30	2¼ to 2¾	"	5½
Alaska	" 12 to 20	30	30	2¼ to 2½	"	7
Extra Early	" 12 to 20	24	36	2¼ to 2¾	"	7
Thorburn's Extra Early	" 12 to 20	29	38	2¼ to 2¾	"	7
Simmers' First of All	" 12 to 20	20	30	2 to 2½	"	5¼
Cleveland's First and Best	" 13 to 22	22	36	2½ to 2¾	"	8
Tom Thumb	" 13 to 22	27	18	2¼ to 2¾	"	7¾
Extra Early Daniel O'Rourke	" 13 to 22	20	30	2 to 2½	"	5¼
Mills' First of All	" 13 to 22	23	30	2¼ to 2½	"	5
Rural New Yorker	" 13 to 22	20	30	2½ to 2¾	"	5
Early May Improved	" 13 to 22	27	38	2½ to 2¾	"	7
Ameer	" 13 to 22	32	35	2½ to 3	Large	4
Bergen Fleetwing	" 13 to 22	34	36	2¼ to 2¾	Medium	10¼
Exonian	" 13 to 22	20	27	2¼ to 2½	"	6¼
Sunol	" 13 to 22	20	32	2¼ to 2½	"	6
Early Frame Improved	" 13 to 24	22	32	2¼ to 2½	"	6¾
Philadelphia	" 13 to 24	19½	36	2¼ to 2¾	"	6½
Premium Gem	" 15 to 24	31	24	2½ to 2¾	"	8
S. B. & M. Co.'s Extra Early	" 15 to 24	34	38	2¼ to 2¾	"	9¼
Gradus	" 15 to 24	16¾	25	3 to 3½	Large	6¾
King Edward VII	" 15 to 24	22½	32	3 to 3½	"	7
Prosperity	" 15 to 24	22	30	2½ to 3½	"	7
Chelsea	" 15 to 24	33½	23	2½ to 3	Medium	6¼
Extra Early Pioneer	" 15 to 24	16¾	30	2¼ to 2½	"	6¾
Nott's Excelsior	" 16 to 25	26	18	2¼ to 2¾	"	7
American Wonder	" 16 to 25	42	16	2¼ to 2½	"	8
Extra Early Kent	" 16 to 25	32	38	2¼ to 2¾	"	7
New Maud S	" 16 to 25	24	48	2¼ to 3	"	9¼
Early Dexter	" 16 to 25	34	36	2¼ to 2½	"	10½
Early Star	" 17 to 25	24	30	2 to 2½	"	5¾
Ringleader	" 17 to 25	22	38	2¼ to 2½	"	8¼
Hancock	" 17 to 25	22	40	2¼ to 2¾	"	9
Blue Beauty	" 17 to 26	22	24	2½ to 2¾	"	6½
Blue Peter	" 17 to 26	28	18	2¼ to 2½	"	8
Evergreen	" 18 to 26	22	32	2¼ to 2½	"	5½
Dwarf Wrinkled Sugar	" 18 to 26	25	24	2½ to 3	"	9¼
Kentish Invicta	" 20 to 29	27	42	2¼ to 2½	"	9
King of the Dwarfs	" 22 to 29	38	24	2¼ to 2¾	"	9
Carter's Up to Date	" 22 to 29	39	46	3 to 3¾	Large	9
Alpha	" 22 to 29	25	41	2 to 2½	Medium	8
Admiral	" 24 to Aug. 1	39	38	2 to 2½	Small	12
Pride	" 24 " 1	33	43	2½ to 2¾	Large	10
French Canner	" 24 " 1	34	36	2½ to 3	Small	10½

PEASE—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Season of Green Peas.	Weight of Green Peas.	Height of Vine.	Length of Pod.	Size of Pea.	Yield of Ripe Seed.
		Lbs.	Inches.	Inches.		Lbs.
Boston Wrinkled	July 24 Aug. 1	31	34	2½ to 2¾	Medium	11½
McLean's Prolific	" 24 " 1	25	32	2¾ to 3½	"	7
Duke of York	" 24 " 1	30	36	3 to 3½	Large	8½
Anticipation	" 24 " 3	37	30	2½ to 3¼	"	9½
Dwarf Telephone	" 26 " 3	44	20	3 to 3½	"	7½
McLean's Gem	" 26 " 3	50	30	2½ to 2¾	Medium	10½
Eugenie	" 26 " 3	46	40	2½ to 3	"	10½
900 to 1	" 26 " 3	46	46	2¼ to 3¼	"	9½
Pride of the Market	" 26 " 3	44	31½	2¼ to 2½	"	12½
Stanley	" 26 " 3	31	31	3¼ to 4	Large	9¼
Champion of England	" 26 " 3	35	43	2¾ to 3¼	"	10
Burpee's Profusion	" 26 " 3	43	40	2½ to 2¾	"	10½
Horsford's Market	" 26 " 3	37	36	2½ to 2¾	Medium	11
Sutton's Satisfaction	" 26 " 3	48	40	2¾ to 3	"	10¼
New Giant-Podded Marrowfat	" 26 " 3	48	32	3 to 3½	Large	13¼
Black-eyed Marrowfat	" 26 " 3	48	46	2½ to 3	"	14½
Laxton's Alpha	" 26 " 3	43	44	2 to 2½	Medium	10¾
Hair's Dwarf Mammoth	" 26 " 3	39	32	2½ to 3¼	Large	10
Abundance	" 26 " 3	38	32	2¼ to 2¾	Medium	11½
Everbearing	" 26 " 3	38	42	2¾ to 3½	Large	9¼
Schereizer's Giant	" 26 " 3	38	52	3 to 3¾	Medium	7¼
Prince of Wales	" 26 " 3	29	36	2½ to 3	Large	8¼
Startler	" 26 " 3	30	35	2½ to 3	"	11
Daisy	" 26 " 3	36	28	2½ to 3	"	10½
Sutton's Dwarf Defiance	" 26 " 3	46½	24	3 to 4	"	10¼
Melting Sugar or Edible-podded	" 26 " 5	35	53	2½ to 3	Medium	14
Profusion	" 26 " 5	44	30	2¼ to 2¾	"	9¼
Grant's Favourite	" 26 " 5	31	48	2¼ to 2½	"	10
Scimitar	" 26 " 5	50	48	3 to 3¾	Large	10½
Forty-fold	" 26 " 5	47	52	2 to 2½	Medium	12
Telegraph	" 26 " 5	46	43	2¾ to 3	Large	10
Heroine	" 27 " 5	36	34	3¼ to 4	"	9
Queen	" 28 " 5	48	34	3¼ to 4	"	11½
Juno	" 28 " 5	42	24	2½ to 2¾	Medium	10
New Victory	" 28 " 5	34	40	3¼ to 4	Large	10½
Sharp's Queen	" 29 " 5	24	36	3 to 3¾	"	8½
Duke of Albany	" 29 " 5	53	40	2½ to 3	"	14
Shropshire Hero	" 29 " 5	58	30	3 to 3¾	"	12
Veitch's Perfection	" 29 " 5	22	42	2¼ to 2¾	Medium	6
Sander's Marrow	" 29 " 5	26	40	2¼ to 2¾	"	11½

BEANS.

Thirty-two varieties of garden beans were grown to test their value for green beans and for ripening. These were planted in rows 3 feet apart, 2 rows of each 66 feet long. One plot was pulled when the string beans were fit for market, and the weights are given in the following table. The other plot was allowed to ripen its seed. The seed was planted June 3, in rows 1½ inches deep and 3 inches apart in the row.

The land was previously in pease, and received no stable manure this year. When the seed was sown complete fertilizer at the rate of 150 pounds per acre was scattered along the row and worked in when the seed was covered. The soil was a clay loam. The season was very favourable for this crop, and the bean pod spot was not so prevalent as it was last year.

Cylinder Ivory-podded Wax and Yosemite Wax are exceptionally fine golden podded varieties, but they are more liable to be attacked by the pod spot than some of the other golden sorts. The Extra Early Edible podded is a very fine extra early green pod variety. Pods of these three varieties will keep tender longer than any of the

other sorts tested. For general croppers the following are recommended:—Extra Early Edible podded, Early Long Yellow Six Weeks, Extra Early Red Valentine and Refugee, for green sorts, and Dwarf German Black Wax, Wardwell's Kidney Wax, Detroit Wax and Keeney's Rustless Wax for golden podded sorts. These come in the order named for market.

BEANS—Test of Varieties.

Name of Variety.	Dates when Pulled.			Total Yield per Plot.	Colour of Pod.	Quality for String Beans.	Length of Pod.	Proportion Rusted.	Yield of ripened seed.
	Aug. 1.	Aug. 9.	Aug. 20.						
	Lbs.	Lbs.	Lbs.	Lbs.			Inches.		Lbs.
Currie's Rust-proof Golden Wax.	35	14¼	9	58¼	Yellow.	Fair....	3¾ to 4½	Slight.....	9
Extra Early Edible Podded......	29½	10	9	48½	Green..	Good...	3 " 4	Very slight	8
Flageolet Scarlet Wax..........	26	7¾	19	52¾	Yellow.	Fair....	4½ " 5½	" ..	9¾
Early Mohawk..................	26¼	11	18	55¼	Green..	"	4½ " 5½	" ..	8½
Early Golden Wax...	24	10	18¼	52¼	Yellow.	Good...	3½ " 4	Slight.....	10¾
Early Black Dwarf Wax........	23	10¾	8	41¾	" ..	Fair....	3¾ " 4½	Badly......	6
Wardwell's Dwarf Kidney Wax.	22¼	6½	12	40¾	" ..	"	4 " 5	"	7½
Cylinder Ivory Podded Wax....	22	10	18½	50½	" ..	Good...	3½ " 4½	"	8¼
Rust-proof Golden Wax.........	22	8¾	15	45¾	" ..	" ...	3¼ " 4¼	Slight.....	6¾
Early Long Yellow Six Weeks..	22¼	5¼	16	43½	Green..	Fair...	4½ " 5½	"	10¼
Emperor of Russia.............	16¼	8½	12	36¾	" ..	"	4¼ " 5	None.....	6
Black Eyed Wax................	14	14½	10¾	39	Yellow.	Good...	3¾ " 4¾	Very slight	6
New Golden Eyed Wax.........	14	8½	8	30½	" ..	Poor...	3½ " 4½	Badly......	6½
Yosemite Wax.......	12¼	14¼	15	41½	" .	Good...	4½ " 5½	Slight.....	5½
Dun Colour	12	11½	6	29½	Green..	Poor...	4½ " 5¼	"	7¼
California Pea......	10¼	14	18¾	43	" .	Fair....	3½ " 4	None......	8¾
Speckled Wax..................	6¼	13½	24	43¾	Yellow.	"	4½ " 5¼	Slight.....	9
Fame of Vitry..................	......	30¼	25	55¼	Green..	"	6 " 6¾	None......	9¾
Early China...........	....	28¾	4	32¾	" ..	"	4 " 5¾	Very slight	8
New Triumph..................	......	28½	18	46½	" ..	Poor...	4½ " 5	None......	10
New Stringless.	.....	27	6¾	33¾	" ..	Good...	4 " 4¾	Slight.....	10
Extra Early Red Valentine......	....	26	22¼	48¼	" ..	Fair....	3¾ " 4½	Very slight	10¼
Early Large White Marrowfat..	......	24¼	12	36¼	" ..	"	3¼ " 4	" ..	10
Royal Dwarf Kidney............	......	22	23½	45½	" ..	"	5 " 6½	" ..	10½
Keeney's Rustless Wax.........	......	22¼	15	37¼	Yellow.	Good...	3¼ " 3¾	None......	6¾
Faber's I. X. L.................	....	22¼	14	36¼	Green..	Fair....	4½ " 5	Very slight	9¼
Canadian Wonder...	...	16¼	28	44¼	" ..	"	4½ " 5½	None......	11¼
Black Speckled Wax...........	.....	16	28¼	44¼	" ..	"	5½ " 6	"	8
Detroit Wax....................	......	16	14¼	30¼	Yellow.	"	3½ " 4¼	Slight.....	8
Rogers Lima Wax..	.....	8¾	45	53¾	" ..	"	3½ " 4	None......	9
Early White Seeded	......	8½	32½	41	Green..	"	3 " 3¼	Very slight	7½
Refugee......	......	......	36¼	36¼	" ..	" ...	4½ " 5	None......	5

BEANS FERTILIZED AND NOT FERTILIZED.

To gain information as to the value of an application of complete fertilizer to hasten the bean crop for early market, three varieties of beans were sown in duplicate rows, one row of which was fertilized at the rate of 200 pounds per acre scattered along the row covering a space of 6 inches wide which was raked in before seeding. The other row received no fertilizer. Drills were made 1½ inches deep, and the seed placed 2 inches apart and covered. The seed was sown June 3. The land was similar to that on which the other beans were grown. The weights as given below were obtained in each case from 1 row 66 feet long. There were also duplicate plots which were allowed to ripen their seed. There is apparently a marked difference in favour of using fertilizer to hasten the crop for early market.

Name of Variety.	Fertilized.	When Pulled and Yield.			Total Yield from Plot.	Ripe seed per Plot.
		Aug. 3.	Aug. 9.	Aug. 20.		
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Dwarf German Black Wax	Yes.	22¼	2	2¼	26½	6¼
" "	No.	12	5½	2	19½	5¾
Detroit Wax	Yes.	14¼	16¼	11¾	42¼	9½
"	No.	2	24½	10½	35	6¾
Long Yellow Six Weeks	Yes.	20	21¾	6	47¾	8¾
" "	No.	4¼	20½	2	26¾	7¾

ONIONS.

Eighteen varieties of onions were sown in a hot-bed March 25, in rows 3 inches apart and three-quarters of an inch deep. The seed was scattered so that from 10 to 12 seeds occupied an inch of row. These made good growth, with the exception of Prizetaker, which variety failed to germinate. The plants were transplanted to the open ground May 11. At this time they were about one-half the size of a lead pencil.

The land had previously been in garden crops, and was in a fairly good state of fertility. It was manured in the fall of 1900 with 20 tons of stable manure per acre, which was ploughed under. This was worked up in the spring and the land run into rows 30 inches apart. These rows were raked off and fertilized at the rate of 400 pounds per acre with complete fertilizer, which was raked in on top of the levelled rows. Two rows of onions were set to each marked row, placed 6 inches apart, and the plants were set 3 inches apart in the rows. The soil was a clay loam.

The distance generally advised for onions is in rows 12 inches apart on level ground, and 3 inches apart in the rows. The plants were set three-quarters of an inch deep in the ground. If the soil is light they would do better if planted still deeper.

If the onion seed is to be started in the open ground the land should be worked up as early in the spring as possible. The earlier the seed is in the better. If grown in this way the Bartletta and Extra Early Flat Red have been the best sorts tested here for that method of culture. Few varieties of onions have done well here from seed sown in the open ground. The season is too short and they do not mature properly. The transplanting takes very little more time than thinning the plants which is necessary when the seed is sown in the field. No plant is more easily transplanted than the onion, and the plants can be set any time after the first of May.

The onion grows best on a soil previously well enriched, and having an abundant amount of available plant food. The manure if applied in the spring should be well rotted and thoroughly worked into the surface soil. The best practice is to manure in the fall and continue growing this crop on the same ground for several years.

The first four named sorts in the list which follows are early white varieties. The Mammoth Silver King is a very large growing white onion, maturing early. The Prizetaker has previously been tested, and ranks as one of the best for transplanting and for general crop. The Yellow Globe is also a splendid sort for this purpose. Onions should be gathered as soon as the crop is matured, or when the most of the necks have withered and turned yellow. The white onions if not pulled and stored when matured are liable to turn green, which lessens their value very much.

The onions should first be allowed to dry for a week or ten days in piles in the field. If the weather is not favourable, as is often the case here, they should be spread on the floor of an outbuilding until thoroughly cured. They keep best in a dry, cool cellar with the temperature just above the freezing point. They should be cured with the

tops on, and will keep well in this condition, and topping can be done when they are prepared for the market.

The yield of the different varieties as given below is from one row 33 feet long. The varieties are given in the order of their earliness.

ONIONS—TEST OF VARIETIES.

Name of Variety.	Date when Pulled.	Yield of Row 33 ft. long.
		Lbs.
Paris Silverskin	Sept. 2	33½
Barletta	" 2	29½
New Queen	" 2	24½
White Dutch	" 2	30½
Extra Early Flat Red	" 11	18¼
Wethersfield Large Red	" 11	20¾
Southport White Globe	" 11	14¾
Mammoth Silver King	" 11	38½
Australian Brown	" 11	29¼
Blood Red	" 11	32½
Straw-coloured Spanish	" 11	34½
Market Favourite Keeping	" 11	26½
Southport Yellow Globe	" 11	40
James' Keeping	" 11	23
Trebon's Large Yellow	" 11	29
Golden Globe	" 11	17¼
Danver's Yellow Globe	11	25½

CABBAGE.

Twenty-three varieties of cabbage were grown in the test plots. The object of the experiment was to obtain information as to the value of the different sorts for early market purposes. The seed was sown in a hot-bed April 13, in rows 4 inches apart. The plants were thinned to one inch apart in the rows on April 25, and were set in the open ground May 15. The glass should remain off the hot-beds for 10 days before putting the plants out to harden them up. The plants should be given plenty of room in the hot-bed and not too much water.

The soil in which the plants were set was a heavy clay loam, which was manured in the fall of 1900 with stable manure at the rate of 20 tons per acre. This was ploughed under, and the following spring was worked up and run into rows 30 inches apart. The rows were raked off and the plants put out. On May 30, a tablespoonful of nitrate of soda was scattered on the soil around each plant, covering a space of about 5 inches in diameter. Nitrate of soda supplies nitrogen in a readily available form, giving the plants a vigorous start. They made good growth at the beginning, but owing to the exceptionally dry weather they did not produce large heads.

The cabbage root maggot did not give any trouble this season, and seems to have entirely disappeared. The cabbage worm *Pieris rapae* is increasing, and is found to be a very troublesome pest.

Twenty plants of each variety were set in rows 30 inches apart, and 24 inches apart in the rows. The yield has been calculated from the produce of one row 33 feet long, there being 16 plants in this area. These were cut and weighed August 18 and 29. The following table gives the varieties in the order of their earliness. Heads of some of the varieties were fit for market before the 18th, and many of the later sorts were not fully developed.

It was found that Flat Parisian, very early; Express and Early Spring, early; and Vandergaw, later, were the best of all the sorts tested.

CABBAGE—TEST OF VARIETIES.

Name of Variety.	Aug. 18.		Aug. 29.		Total Number of heads pulled.	Total Weight of heads.
	Number of heads pulled.	Weight of heads.	Number of heads pulled.	Weight of heads.		
		Lbs.		Lbs.		Lbs.
St. John's Day	12	21¼	4	7¾	16	29
Paris Market	8	19½	8	23¼	16	42¾
Flat Parisian	12	31¼	4	11	16	42¼
Jersey Wakefield	10	29½	6	18½	16	48
Express	11	23¾	5	13¼	16	47
Early Spring	11	25½	5	10½	16	46
Etampes	9	25¼	7	17¾	16	43
Earliest of All	9	21	7	16¾	16	37¾
Imp. Early Summer	8	24½	8	22	16	46½
Early Summer	7	17½	9	19½	16	37
Early Flat Dutch	7	21	9	27½	16	48½
Earliest White Giant	7	19½	9	26	16	45½
Winningstadt	7	15¾	9	23½	16	39¼
Vandergaw	7	18½	9	23½	16	42
Burpee's All Head	6	17	10	29½	16	46½
All Seasons	4	12	12	33½	16	45½
Succession	4	9¾	12	27½	16	36½
Dwarf Savoy	4	10½	12	23	16	33½
Green Globe Savoy	3	7	13	25	16	32
Fottler's Brunswick	2	7	14	44½	16	51½
Surehead Improved	2	6	14	40½	16	46½
Premium Flat Dutch	2	6½	14	43	16	49½
Marblehead Mammoth	2	6¼	14	39½	16	45¾

CAULIFLOWER.

Eight varieties of cauliflower were tested on land similar to and receiving the same preparation as that on which the cabbages were grown. The seed was sown in the hot-bed April 9, and transplanted to another hot-bed April 25 in rows 3 inches apart, and 2 inches apart in the rows. They were planted in the open ground May 15, in rows 30 inches apart, and 20 inches apart in the rows. The yield given in the following table was from one row 33 feet long, there being 20 plants in that length of row. Twenty-five plants were set of each variety.

The first heads of the early varieties were very good, especially the Early Snowball and Extra Early Whitehead, but the season becoming very dry the remainder of the heads were not well formed. The Nonpareil, formerly tested here, and considered a good sort was poor this season, forming but few good compact heads. This was probably due to the dry weather. The Half Early Paris was very poor. The Large Late Algiers gave some good heads later in the season.

The cauliflower plant requires a good, deep, rich loam, retentive of moisture, as the heads do not fill out well and compact unless well supplied with water.

The root maggot did not trouble any of the plants. Nitrate of soda applied at the same time and in similar manner to that used on the cabbages proved valuable in giving a quick vigorous early growth to the cauliflowers.

Name of Variety.	Cut July 20.		Cut July 26.		Cut Aug. 5.		Total Yield.		Character of Head.
	Number of Heads.	Weight of Heads.	Number of Heads.	Weight of Heads.	Number of Heads.	Weight of Heads.	Number of Heads.	Weight of Heads.	
		Lbs.		Lbs.		Lbs.		Lbs.	
Early Snowball	8	14	10	20	2	3¼	20	37¼	Good.
Gilt Edge	10	14½	6	7¼	4	3	20	24¾	Fair.
Extra Early Selected Erfurt	9	10½	7	9½	4	3¼	20	23¼	"
" Whitehead	8	15½	8	11¾	4	5¼	20	32½	Good.
" Paris or Nonpariel	5	7½	6	7¼	9	9¾	20	24½	Fair.
Half Early Paris	......	......	......	......	13	13½	13	13½	Poor.
Chambourcy's Mammoth	......	......	......	......	15	22¾	15	22¾	Very poor.
Late Algiers,	......	......	......	......	2	2¼	2	2¼	Good later.

TOMATOES.

Experiments were conducted this season with 48 varieties of tomatoes. The seed was sown in a hot-bed March 25, in rows 3 inches apart. The plants were thinned to one inch apart in the rows when quite small, and on April 16 were set, one plant to a strawberry box filled with soil. These boxes were put close together into another hot-bed on about 1 inch of soil and remained there until put out in open ground on June 8.

The tomato plant likes plenty of heat, and growth is vigorous if proper conditions are given. The plants, however, should have sufficient ventilation to make them stocky and thrifty, and after the middle of May the glass should be left off the hot-bed as much as possible. When grown in strawberry boxes the earth soon dries out, making frequent watering necessary. The plants were put in the open ground in rows, 4 feet apart each way. The boxes in which the plants were grown were taken to the field and cut so that the plants with the earth attached could be taken out and placed in position without checking growth.

The land on which these plants were put was previously in millet, and received no barn-yard manure for the tomato crop. After the plants were out a week a handful of nitrate of soda was scattered around each plant just before a rain. This proved very beneficial and gave a vigorous early growth not obtained in any other way.

The varieties of rough and irregular growth are not as suitable for market as the smoother sorts, and some of the earliest ripening varieties are of this character. Some, however, of the smooth sorts ripen the bulk of their crop about as early as many of the wrinkled ones. Of the wrinkled sorts the earliest of all, Early Richmond and Early Conqueror are recommended. The last named sort is developing into a much smoother fruit than formerly, and splendid market specimens were obtained from some plants of this variety. The varieties recommended for market and general use are Early Ruby, Atlantic Prize, Fordhook's First, Dwarf Champion, and New Stone.

The quantity of fruit obtained from four plants of each variety is given in the following table. The balance of the fruit not ripened was picked September 10.

TOMATOES—EXPERIMENTS WITH VARIETIES.

Name of Variety.	Date of Early Pickings, and Yield of Ripe Fruit. Aug. 19.		Aug. 27.		Aug. 31.		Total Yield from 4 plants of Ripe Fruit.		Total Yield from 4 plants of Green Fruit.		Total Yield from 4 plants.		Size and Character of Fruit.
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	
Earliest of All	3	4	5	15	6	4	26	7	14	2	40	9	Small rough.
Early Conqueror	1	15	8	9	14	..	32	8	16	..	48	8	Medium smooth.
Acme	1	8	3	4	5	1	14	9	22	..	36	9	"
Livingston's Perfection	1	7	4	9	6	7	24	..	16	..	40	..	Large smooth.
Early Ruby	1	4	16	6	10	8	41	14	14	2	56	..	Medium smooth.
Brinton's Best	..	11	2	8	7	9	21	10	30	..	51	10	"
Matchless	..	11	3	14	4	..	19	13	12	..	31	13	Large smooth.
Early Bermuda	..	10	3	8	3	12	13	8	18	..	31	8	Large rough.
Mikado	..	9	2	4	4	12	13	9	22	..	35	9	Medium smooth.
Improved Trophy	..	9	1	2	4	12	15	7	45	8	60	15	"
Mitchell's No. 1	..	8	1	8	3	2	9	10	35	..	44	10	Large rough.
Money Maker	..	7	4	3	7	10	23	4	49	..	72	4	Large smooth.
Early Richmond	..	6	5	2	6	9	28	9	16	9	45	2	Large rough.
Beauty	..	5	1	10	4	9	14	..	31	..	45	..	Medium smooth.
Early Bird	..	4	3	5	7	11	31	4	20	10	51	14	"
Potato Leaf	..	4	4	8	3	10	15	6	20	..	35	6	Large smooth.
New Stone	..	2	..	8	3	..	10	10	28	..	38	10	"
Favourite	..	2	1	11	2	2	9	..	32	..	41	..	"
Mayflower	..	..	6	4	4	14	20	2	16	..	36	2	Medium smooth.
Ponderosa	..	..	4	12	2	4	13	..	50	..	63	..	Very large rough.
Ignotum	..	..	4	12	5	4	18	8	45	..	63	8	Large smooth.
Crimson Cushion	..	..	4	7	5	2	10	7	24	..	34	7	Large rough.
Atlantic Prize	..	..	4	6	6	2	21	8	35	..	56	8	Medium smooth.
Canada Victor	..	..	4	6	5	1	18	6	27	..	45	6	"
Royal Red	..	..	4	4	4	1	18	7	37	..	55	7	Large smooth.
Volunteer	..	..	4	..	4	8	14	8	37	8	52	..	"
Comrade	..	..	3	12	3	2	17	6	32	..	49	..	Medium smooth.
Lorillard	..	..	3	5	8	..	18	..	40	..	58	1	"
New Enormous	..	..	3	4	4	9	23	3	42	..	65	3	Large rough.
Democrat	..	..	3	..	4	7	12	7	45	9	58	..	Medium rough.
Aristocrat	..	..	2	8	4	12	12	12	43	7	56	3	Medium smooth.
New Everbearing	..	..	2	8	3	9	9	9	31	6	40	15	"
Potomac	..	..	2	6	4	12	20	8	37	8	58	..	"
Bond's Early Minnesota	..	..	2	4	4	6	17	10	41	..	58	10	"
Conference	..	..	2	4	9	6	20	10	20	..	40	10	"
Creekside Glory	..	..	2	3	7	10	18	1	33	..	51	1	Large rough.
Baltimore Prize Taker	..	..	2	2	6	12	14	14	37	2	52	..	Medium smooth.
Maule's New Imperial	..	..	2	1	2	9	22	2	38	..	60	2	Large smooth.
Imperial	..	..	2	..	8	..	26	..	40	6	66	6	"
Fordhook's First	..	..	2	..	8	12	16	12	28	..	44	12	"
Buckeye State	..	..	1	13	3	4	18	..	40	.	58	..	"
Waldorff	..	..	1	12	3	8	14	4	18	..	32	4	Small smooth.
Large Red Perfection	..	..	1	8	1	14	9	6	34	..	43	6	Large rough.
Thorburn's Long Keeper	..	..	1	..	1	10	9	10	28	..	37	10	Large smooth.
Honor Bright	..	..	..	12	1	10	18	2	32	..	50	2	"
Golden Queen	..	..	..	10	3	14	14	..	37	10	51	10	"
Table Queen	..	..	..	10	5	8	13	2	25	..	38	2	"
Fordhook's Fancy	..	..	..	..	3	1	11	2	21	..	32	2	Small smooth.

CORN.

Twenty varieties of garden corn were tested. The seed was sown June 5, on the level, in rows 3 feet apart, and the plants were thinned to 10 inches apart in the rows. The land was in garden pease the previous season, and was of a sandy loam character. It was ploughed in the spring and worked up. No barn-yard manure was used, but complete fertilizer at the rate of 500 pounds per acre was sown broadcast and harrowed in with the smoothing harrow. The horse cultivator was run through the rows at intervals of 10 days during the summer.

The season was very suitable for the corn plant. The continuous warm weather matured the crop early, and varieties that have never before eared sufficiently for market produced a fine crop. The yield was calculated in each case from the product of one row 33 feet long. The following table gives the date of pulling, number of ears and weight of crop. The variety, Peep-O'Day, was the earliest variety grown. The best varieties as to quality were Crosby's Early, Early Marblehead and Early Minnesota. The Metropolitan, New Champion and Nonesuch are excellent sorts for main croppers.

EXPERIMENTS WITH CORN.

Name of Variety.	When Pulled.	Number of Ears.	Weight of Ears.	Length of Ears.
			Lbs.	Inches.
Peep O'Day	Aug. 29	50	23	5½ to 6
Ford's Early Sugar	" 29	56	25	5½ " 6½
First of All	" 29	50	27	6 " 7
Red Cory	Sept. 2	40	20½	6½ " 7
White Cory	" 2	42	28	6½ " 7
Adams' Extra Early	" 2	46	24	6 " 6½
Early Marblehead	" 2	40	23	6½ " 7½
Crosby's Early	" 12	42	17½	6 " 6½
Mammoth White Cory	" 12	40	18¼	5½ " 6
Early Minnesota	" 12	52	28	6 " 7
Metropolitan	" 12	40	33	6½ " 7½
New Champion	" 12	46	37	7 " 8
Nonesuch	" 15	40	34	6¾ " 7½
Earliest Sheffield	" 15	44	26	6 " 6½
Old Colony	" 17	40	34	6½ " 7½
Moore's Early Concord	" 17	40	29	6½ " 7
Perry's Hybrid	" 19	48	36	6 " 7
Hickox Improved	" 19	40	36	6½ " 7
Canada Yellow	" 19	42	19	6 " 7½
Early Giant	" 22	48	40	6 " 6½

CORN WITH SUCKERS REMOVED AND NOT REMOVED

Three varieties of corn sown at the same time, fertilized in the same manner, and given similar cultivation to that of the other corn plots, were grown to test the result of removing suckers from the corn plant in hastening maturity. The suckers were removed from one row of 33 feet July 20, and one row was left without being removed. No advantage was apparently gained by removing the suckers. The crop was pulled August 27, and the yield obtained was as follows:—

Name of Variety.	Suckered.		Not Suckered.	
	Number of Ears.	Weight of Ears.	Number of Ears.	Weight of Ears.
		Lbs.		Lbs.
Peep O'Day	38	14	34	13
Red Cory	24	11	34	18
First of All	24	12	30	17

PARSNIPS.

Six varieties of parsnips were sown May 16, in rows 30 inches apart. The land was previously in potatoes, and was a heavy clay loam. Barn-yard manure at the rate of 20 tons per acre was spread and ploughed under in the fall of 1900. The land was ploughed and worked up in the spring of 1901, and the rows run. The yields given are from 1 row 66 feet long. The Early Round is a short parsnip of good quality for early use. The Guernsey is a half long sort, which is very desirable. The Hollow Crown is probably the best for general crop, and is of excellent quality.

Name of Variety.	Yield from Plot.	Character of Root.
	Lbs.	
Guernsey	89½	Medium long.
Cooper's Market	88¼	"
Hollow Crown	72½	Long.
Elcombe's Giant	72½	"
Student	69½	Medium long.
Dobbie's Selected	65	"
Early Round	52	Short.

BEETS.

The land on which the beets were grown was of similar character, and the preparation the same as that on which the parsnips were grown. The yields given below were obtained in each case from one row 66 feet long.

Name of Variety	First fit to use.	Yield of Plot.	Remarks.
		Lbs.	
Extra Early Dark Red Flat	July 22..	93	Small, short.
Extra Early Blood Red Turnip	" 25..	108	Medium, short.
Nutting's Dwarf Improved	Aug. 15..	98	Medium, half long.
Dell's Blood Leaf	" 15..	78	Small, half long.
Long Smooth Blood	" 15..	134	Large, long.

WATER MELONS.

Four varieties of water melons were started in a hot-bed by planting seeds May 4, in strawberry boxes filled with loam. One foot of horse manure was used in this hot-bed and a moderate bottom heat obtained. It is not necessary to have much heat at this time of year for if forced the plants tend to have a weak and slender growth.

The bed was kept well ventilated, and the plants were gradually hardened off by removing the glass entirely 10 days before setting them out. They were removed to the open ground June 10. Two plants were allowed to a box, and two boxes were set to a hill, and the hills were made 5 feet apart each way. The boxes were cut and the ball of earth removed with the plants so that no check was given to their growth.

The hills were fertilized with complete fertilizers. The soil was a light loam and was previously in millet, and no manure was used after that crop was removed.

Specimens from all of the varieties ripened. The crop was not heavy and the melons did not grow large, but were of excellent quality. The varieties Peerless, Stoke's Early, Cole's Early, and Vick's Early were grown. For earliness they come in the order named. The Peerless was the finest of the sorts tested.

CUCUMBERS, SQUASH AND PUMPKINS.

Thirty-two varieties of cucumbers. Twenty-four varieties of squash and five varieties of pumpkins were grown on land of similar character to that on which the water melons were grown. Owing to the dry weather the crop was small, but the quality of the squash was above the average.

The White Spine and Boston Pickling cucumbers were the best varieties for general market and pickling purposes. The Bay State and Early Marblehead are two squashes worthy of special mention. The quality of these was exceptionally fine, especially the Bay State. The Hubbard and Essex Hybrid were the two best winter sorts tested.

SPINACH.

Several varieties of spinach were tested. The ground was prepared in a similar manner to that on which the parsnips were grown. The seed was sown in rows 28 inches apart on May 16. The Victoria was the best of the sorts tested, and was fit to use June 22. This plant makes excellent 'greens,' and is of the easiest culture.

EXPERIMENTS WITH EARLY POTATOES.

Eight varieties of early potatoes were planted to test their relative earliness when fertilized in different ways. One-half of a plot of ground was manured in the spring with 20 tons of stable manure per acre. The other half had no manure. The land was ploughed and worked up, and run into rows 28 inches apart. Two rows of a variety were planted through this strip thus making one-half of them manured and one-half not manured. Every other row was fertilized at the rate of 500 pounds of potato fertilizer per acre, which was scattered along the rows and covered with the potatoes. The land was a heavy clay loam, and suffered greatly from the dry season, the crop being very poor.

The first digging was made August 19, to find out what varieties would give the best results at that date. Strips 33 feet long were dug across each set of plots, and the potatoes gathered from each row. The yield given in the following table is from 1 row 33 feet long:—

Name of Variety.	Dug August 19.							
	Not Manured.				Manured.			
	Fertilized.		Not Fertilized.		Fertilized.		Not Fertilized.	
	Marketable.	Not Marketable.	Marketable.	Not Marketable.	Marketable.	Not Marketable.	Marketable.	Not Marketable.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Irish Cobbler....................	25½	6½	18½	4	24	6	19	3½
Burpee's Ex. Early..............	22½	3½	24½	3	18½	5½	15	4
Bovee...	20	6	12	8½	19	6	10½	5½
Early Sunrise..................	17	8½	9	6½	20¾	5½	14	5½
Crown Jewel....................	22½	7	9	5	24½	4	14½	3
Early Gem......................	12	8	9	5½	17	7½	14	6½
Pearce's Ex. Early.............	11	6	10	5	21	4	14½	5½
Early Ohio....	12	6	9	6½	16½	7	11	4½

Name of Variety.	Dug October 4.							
	Not Manured.				Manured.			
	Fertilized.		Not Fertilized.		Fertilized.		Not Fertilized.	
	Marketable.	Not Marketable.	Marketable.	Not Marketable.	Marketable.	Not Marketable.	Marketable.	Not Marketable.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Irish Cobbler....................	34	6	15	6	21	6	19	6
Burpee's Ex. Early	19	9	16	8	27	8	12	4
Bovee............................	22	8½	9½	4½	25	7	18	6
Early Sunrise	16	7½	12	5	19½	6	14½	6½
Crown Jewel....................	26	7½	10	6	24½	8	21½	8½
Early Gem....	16	6	7½	6	19	11½	14	11½
Pearce's Ex. Early............ ..	17	9	12	7	17	9½	16½	10
Early Ohio.................. .	16	9	10	8	22½	8	14	10½

MEETINGS ATTENDED.

I attended the annual meeting of the Nova Scotia Fruit Growers' Association at Wolfville, N.S., January 28 and 29. I also addressed agricultural meetings at the following places:—

January 15.—Collingwood, N.S.
" 16.—Wallace Bridge, N.S.
" 17.—Upper Malagash, N.S.
" 18.—Tatamagouche, N.S.
" 19.—River John, N.S.
" 21.—Earltown, N.S.
" 22.—Central New Annan, N.
" 23.—Wentworth, N.S.
January 24.—Great Village, N.S.
" 25.—Bass River, N.S.
" 30.—Bridgetown, N.S.
March 1.—Kingston, N.B.
" 4.—Berwick, N.B.
" 5.—Jeffrey's Corner, N.B.
June 19.—East Amherst, N.S.

I have the honour to be, sir,
Your obedient servant,

W. S. BLAIR,
Horticulturist.

EXPERIMENTAL FARM FOR MANITOBA.

REPORT OF S. A. BEDFORD, SUPERINTENDENT.

BRANDON, MAN., November 30, 1901.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my fourteenth annual report, with details of experiments undertaken and work accomplished on the Brandon Experimental Farm during the past year.

The past winter was unusually mild. Snow fell early and the ground was completely covered until spring, but owing to the absence of severe wind storms there were very few drifts.

Spring opened about the average date, the first seeding being done at the Experimental Farm on the 8th of April, but on the 15th of April there was a heavy snow storm which delayed seeding for a week. After this date the weather was favourable and seeding was finished by May 16.

During the latter part of May the weather was unusually hot and dry, so much so that in a few instances young plants were completely killed.

On June 6, there was a heavy fall of wet snow. The growing grain was completely covered, while trees and shrubs were bent to the ground and in many instances severely injured.

On the night of the 7th of June, there were six degrees of frost, which severely injured both wild and cultivated fruits.

The rainfall in June was above the average and the growth of grain rank, but very soft and favourable to the spread of rust.

July was quite favourable for the growing crop, and August was dry and free of frost.

September and the early part of October were very showery and unfavourable for stacking and threshing, and much of the wheat became badly bleached, but the yield of all kinds of grain was largely above the average in nearly every part of the province, and the country has produced much the largest crop of grain in its history.

EXPERIMENTS WITH SPRING WHEAT.

Perhaps the most important feature, this year, in connection with this, our most valuable grain, is the remarkably uniform excellence of the crop throughout the province. In no portion of the country has the crop been a failure, and in nearly all parts the yield has been above the average. In addition to this the area sown is larger than usual, these two features combining to make it the largest crop of wheat grown in the country.

Owing to the rank growth of straw and the unfavourable weather, the crop was unusually expensive to harvest and thresh, and it is feared that a considerable portion of it, in some districts, will remain in the stack all winter.

On the Experimental Farm the yield of wheat was gen rally above the average, the only exceptions being the varieties particularly subject to rust, some of these gave a very poor yield of shrivelled grain.

Among the varieties tested this year, for the first time, are a number from Australia. These were, with one exception, badly rusted and the yield was small. Australian No. 13 had good clean straw and was quite productive, but the kernel was small and light. The heads of all the Australian varieties were large, and it is possible that they may compare more favourably in a dry year.

Four interesting varieties were received from the Minnesota Experiment Station. These had long but open heads and none of them equalled the Red Fife in productiveness.

The Goose wheat is again near the head of the list. It was the only variety perfectly free of rust, the straw remaining clean and bright all through the wet harvest weather. The grain is very flinty and not marketable here.

Four of the cross-bred varieties, originated at the Experimental Farms, have this year surpassed the Red Fife for productiveness. One of these, 'Crown,' is also second on the list of the best twelve varieties for the past five years.

There was a remarkable absence of smut in the wheat this year. This is particularly fortunate for had it been otherwise, the wet harvest and threshing season would have very thoroughly distributed the spores, greatly injuring the sample.

Owing to the unfavourable weather during the latter part of the season, most of the grain will grade No. 1 and No. 2 Northern.

About half an acre each of fall wheat and rye were sown during the month of August last. The plants became firmly rooted and were from four to six inches high when winter set in.

Seventy-two varieties of spring wheat were tested this year. They were all sown on the second and third of May, on a sandy loam soil, in plots of one-twentieth of an acre each.

WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
				In.		In.		Lbs	Bush.	Lbs.	Lbs	
Speltz	Aug.	18	108	42	Very weak	[illegible]	Bearded	4,600	45	20	39½	Slightly.
Goose	〃	23	112	46	Stiff		〃	4,820	42	..	62	None.
Crown	〃	17	106	48	Fair	[illegible]	〃	5,020	38	..	59½	Slightly.
Admiral	〃	19	108	50	Stiff	3½	Beardless	4,700	37	20	59½	Badly.
Progress	〃	17	106	50	〃	3½	〃	3,180	37	..	60	〃
Clyde	〃	13	102	48	Fair	3½	〃	4,540	36	40	59½	〃
Red Fife	〃	22	111	51	Stiff	3	〃	5,140	36	40	60	Slightly.
Monarch	〃	20	109	48	〃	3	〃	5,220	36	20	59½	〃
White Russian	〃	22	111	46	〃	3	〃	5,880	36	..	58½	〃
Stanley	〃	17	106	51	〃	3	〃	5,080	36	..	59½	〃
Australian No. 13	〃	22	111	46	〃	3	〃	6,120	36	..	58½	〃
Vernon	〃	20	110	44	Weak	2½	Bearded	6,360	35	40	59	〃
Roumanian	〃	22	112	50	〃	3	〃	4,700	35	40	62	〃
Beauty	〃	20	109	47	Fair	3	Beardless	5,300	35	40	58½	〃
Huron	〃	18	107	46	Stiff	3	Bearded	4,720	35	20	59	Badly.
Alpha	〃	14	103	45	〃	3	Beardless	5,640	35	..	59	〃
Laurel	〃	22	111	46	〃	3½	〃	6,040	35	..	56	Slightly.
Norval	〃	11	101	45	Fair	2½	Bearded	5,320	34	40	59½	〃
Wellman's Fife	〃	20	109	48	Stiff	3	Beardless	5,060	34	40	59½	Badly.
White Fife	〃	20	109	42	〃	3½	〃	5,380	34	20	60	〃
Advance	〃	14	103	48	Fair	3	〃	5,180	34	20	59	Slightly.
Minnesota No. 163	〃	22	111	44	Stiff	3	〃	6,100	34	..	59	Badly.
White Connell	〃	22	111	46	〃	3	〃	5,400	34	..	59¼	Slightly.
Minnesota No. 149	〃	22	112	46	〃	3½	〃	5,620	33	40	59½	Badly.

WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs	
Dawn	"	12	101	41	Fair	3	"	4,440	33	20	59½	Badly.
Benton	"	14	103	39	"	2½	"	4,080	33	20	58½	"
Rio Grande	"	17	107	53	Stiff	3½	Bearded	6,220	33	..	60	"
Campbell's White Chaff.	"	19	108	47	"	3	Beardless	3,640	33	..	59	"
Rideau	"	16	105	45	"	2½	"	3,760	33	..	59	Slightly.
Minnesota No. 169	"	20	111	49	Fair	3½	"	6,240	32	40	59	"
Blenheim	"	17	106	49	Stiff	3	Bearded	5,460	32	20	58	"
Blue Stem	"	25	114	51	Fair	3½	Beardless	4,900	31	40	57¼	Badly.
Weldon	"	22	111	44	Stiff	3	"	5,840	31	40	59	"
Colorado	"	17	106	50	Fair	3½	Bearded	6,420	31	20	59	Slightly.
Plumper	"	20	110	44	Stiff	2½	"	4,120	31	20	60	"
Mason	"	16	105	43	"	3	Beardless	3,680	31	..	61	Badly.
Preston	"	17	106	50	"	3	Bearded	4,940	31	..	58½	"
Byron	"	17	107	49	"	3	"	4,160	30	40	58½	"
Angus	"	16	106	48	"	4	Beardless	5,040	30	40	48	Consid'rably
Dufferin	"	14	103	45	Fair	3	Bearded	3,860	30	40	59	Slightly.
Blair	"	22	112	47	Weak	3	Beardless	5,920	30	20	59½	"
Australian No. 9	"	20	109	46	Fair	3	"	5,680	30	..	58	Badly.
Hungarian	"	20	109	42	"	2½	Bearded	4,660	29	40	59½	Slightly.
Pringle's Champlain	"	16	106	40	"	3	"	6,340	29	20	58	"
Percy	"	10	99	50	Stiff	3	Beardless	4,180	29	20	60	Badly.
Cartier	"	13	102	38	Fair	3	Bearded	4,800	28	..	58½	"
Ebert	"	12	102	43	Stiff	3	Beardless	3,820	28	..	59½	"
Crawford	"	15	105	46	Fair	3	"	5,060	28	..	58½	"
Red Fern	"	20	110	48	"	3	Bearded	5,220	28	..	60	"
Fraser	"	15	105	42	Weak	2½	"	5,740	27	20	58	"
Dion's	"	19	108	50	Stiff	3	"	5,800	27	20	60	"
Early Riga	"	7	96	34	"	2½	Beardless	5,360	27	20	59½	"
Ladoga	"	16	105	42	"	3	Bearded	5,120	27	..	57	Slightly.
Herrisson Bearded	"	15	105	40	Weak	2	"	5,660	26	40	58	Badly.
Countess	"	22	111	24	Stiff	2½	Beardless	4,460	26	20	58½	"
Robin's Rust Proof	"	22	111	42	Fair	3	"	5,320	26	..	60	"
Beaudry	"	14	103	42	Weak	2½	Bearded	5,360	25	40	58½	"
Australian No. 10	"	22	112	45	Fair	3¾	Beardless	6,560	25	20	55	"
Minnesota No. 181	"	22	112	44	Weak	3	"	5,940	25	..	56	"
Bishop	"	16	106	45	Stiff	3	"	4,400	24	40	58	"
Red Swedish	"	20	109	40	Weak	3	"	4,880	24	20	59	"
Essex	"	20	109	47	"	3½	"	5,240	24	.	56	"
Harold	"	17	107	40	"	2	Bearded	6,440	23	20	57½	"
Australian No. 25	"	22	112	46	Fair	3¾	Beardless	5,600	21	20	55	"
Cassell	"	22	112	45	Weak	3½	"	6,040	20	40	56	"
Hastings	"	20	109	44	"	3	"	5,240	20	40	59	"
Australian No. 23	"	22	111	46	"	3½	"	5,920	19	20	55½	"
Chester	"	22	111	44	Fair	3	"	5,320	19	20	57½	"
Captor	"	14	103	39	"	3½	"	6,260	18	..	59	"
Australian No. 19	"	22	112	43	"	3½	"	6,200	18	..	55	"
Australian No. 27	"	20	110	45	"	3½	"	5,240	17	20	55½	"
Japanesse	"	28	99	43	"	3	Bearded	1,860	17	40	50	Slightly.

AVERAGE Results of a Five Years' Test of Twelve Varieties of Wheat.

Name of Variety.	Years included.	Average Yield per Acre.	
		Bush.	Lbs.
Goose	1896, 1897, 1898, 1899, 1901	40	32
Monarch	1896, 1897, 1898, 1899, 1901	37	2
White Fife	1896, 1897, 1898, 1899, 1901	36	36
Crown	1896, 1897, 1898, 1899, 1901	36	32
Red Fife	1896, 1897, 1898, 1899, 1901	34	42
White Russian	1896, 1897, 1898, 1899, 1901	34	28
Hungarian	1896, 1897, 1898, 1899, 1901	32	38
Pringle's Champlain	1896, 1897, 1898, 1899, 1901	32	32
Huron	1896, 1897, 1898, 1899, 1901	32	22
Advance	1896, 1897, 1898, 1899, 1901	31	22
Colorado	1896, 1897, 1898, 1899, 1901	29	24
Herrisson Bearded	1896, 1897, 1898, 1899, 1901	27	42

FIELD PLOTS OF SPRING WHEAT.

All were sown on summer-fallow in the proportion of one and a half bushels of seed per acre.

Variety.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Yield per Acre.	
		Acres.				Bush.	Lbs.
Red Fife	Clay loam	7	April 24	Aug. 12	110	28	42
Preston	"	5	" 24	" 14	112	33	36
"	Sandy loam	5	" 8	" 8	122	21	18
White Fife	"	5	" 22	" 12	112	23	30
Stanley	"	3	" 22	" 8	108	25	27
Red Fife	"	3	" 22	" 12	112	26	..
White Connell	"	2	" 23	" 12	111	26	45
Percy	"	2	" 24	" 8	106	28	..
Monarch	Clay loam	2	" 24	" 21	119	31	30
Speltz	"	2	" 25	" 16	113	47	10
Dawn	Sandy loam	1	" 10	" 7	119	22	..
Wellman's Fife	"	1	" 10	" 10	122	30	..
Ladoga	"	1	" 23	" 8	107	29	..
Crown	"	1	" 23	" 9	108	26	..
Advance	"	1	" 23	" 8	107	32	..
Huron	Clay loam	$\frac{3}{4}$	" 25	" 12	109	41	24
Laurel	"	$\frac{1}{2}$	" 26	" 21	117	37	
White Russian	"	$\frac{1}{2}$	" 26	" 16	112	31	

THICK AND THIN SOWING OF WHEAT.

As many requests for information on this point reach the Experimental Farm, it was thought advisable to repeat the experiment. Evidently, fairly thick seeding, such as the usual 1½ bushels per acre, gives the largest return on such soil as that on the Experimental Farm.

The size of the plots for this test was 1-20 acre, and the soil was a rich sandy loam, which had been summer-fallowed, and they were all sown on May 2.

Wheat—Thick and Thin Sowing.

Name of Variety.	Amount of Seed sown per Acre.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.
				Inches.		Inches.		Bush. Lbs.	Lbs.
Wellman's Fife.	6 pecks...	Aug. 20..	110	50	Stiff......	3½	Beardless.	36 ..	59½*
" ..	5 " ...	" 20..	110	50	"	3½	" .	31 20	59½*
" ..	4 " ...	" 20..	110	50	"	3½	" .	23 20	56½*

* Badly rusted.

Wheat and Flax Mixed.

This mixture is grown quite extensively in portions of the Red River Valley, in the United States.

One peck of flax and seven pecks of wheat are sown at the same time. The combined crop is cut and threshed, and the grain is separated with a fanning mill.

On the Experimental Farm, both the flax and the wheat germinated well, but the wheat soon took the lead and crowded out the flax, so that the stalks were exceedingly small and did not produce seed.

The size of the plots used for this test was one-twentieth of an acre, and the soil was a sandy loam, summer-fallowed.

Quantity of Wheat sown per Acre.	Quantity of Flax sown per Acre.	Date Sown.	Date Ripe.	Number of Days Maturing.	Yield per Acre.	Weight per Bushel.
					Bush. Lbs.	Lbs.
7 pecks...............	1 peck................	May 15.....	August 28..	105	21 20	57½
7 "	None...........	" 15. ...	" 28..	105	28 40	59

Wheat and Rape Mixed.

Where fall pasture is scarce, this mixture is used to a considerable extent. The rape is sown with the wheat at the rate of 2 pounds per acre, and both are allowed to grow together until harvest, when the binder is set high enough to miss the rape. After the crop of grain is cut, the rape is pastured off.

This year, the rape only grew on the outer edges of the plot and on any thin spot among the grain. Altogether, not more than 50 rape plants grew, and the yield of rape was not sufficient to pay for the seed sown.

The size of plot used for this test was one-twentieth acre. The soil was a sandy loam, summer-fallowed, and both plots were sown on May 15.

Quantity of Wheat sown per Acre.	Quantity of Rape sown per Acre.	Date Sown.	Date Ripe.	Number of Days Maturing.	Yield per Acre.	Weight per Bushel.
					Bush. Lbs.	Lbs.
7 pecks.	2 pounds........... .	May 15.....	August 28..	105	25 40	57
7 "	None..................	" 15.....	" 28..	105	28 40	59

SUMMER-FALLOW COMPARED WITH UNPLOUGHED STUBBLE.

This year the difference in favour of summer-fallow is less than usual, no doubt owing to the rank growth on the latter. The stubble land had only borne one crop since it was summer-fallowed.

The size of plots used for this test was one-fortieth of an acre, and the soil was a sandy loam. Both plots were sown on May 15.

Variety.	How Prepared.	Rust.	Ripe.	Length of Straw.	Length of Head.	Yield per Acre.	Weight per Bushel.
				Inches.	Inches.	Bush. Lbs.	Lbs.
Red Fife..........	Summer-fallowed ..	Little	Aug. 28...	45	3	28 40	59
"	Stubble, unploughed	" ...	" 28...	42	3	28 ..	58

A TEST OF FERTILIZERS FOR THE GROWING OF WHEAT.

Unlike last year's experience with this test, the conditions were quite favourable. A shower followed directly after the spreading of the fertilizers, and they were at once washed into the soil and the wind had no opportunity to blow them away.

From the accompanying tables it will be noticed that the plants treated with nitrate of soda have given the best returns.

The size of the plots was one-fortieth acre, the soil was a rich clay loam which had been summer-fallowed. All were sown on May 10, and all were harvested on August 23.

The variety of wheat sown on all the plots was Red Fife, one and one-half bushels of seed per acre.

Red Fife Wheat, Fertilizers Applied.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw per Acre.	Yield per Acre of Wheat.	Weight per Bushel.
	In.		In.			Bush. Lbs.	Lbs.
100 lbs. per acre of nitrate of soda, ½ sprinkled when the grain was 2 in. high, balance when 6 in. high..........	49	Stiff..	3	Beardless.	4,000	39 20	60
200 lbs. per acre of nitrate of soda, ½ sprinkled when the grain was 2 in. high, balance when 6 in. high..................................	47	" ..	3	" ..	4,300	40 ..	60¼
No fertilizer used..................................	49	" ..	3	" ..	5,100	31 20	59¾
Superphosphate, 400 lbs. per acre, spread just before sowing.	51	" ..	4	" ..	3,700	25 20	58½
Muriate of potash, 200 lbs. per acre, spread just before sowing.	48	" ..	3	" ..	4,200	30 40	59¾
A mixture, 200 lbs. superphosphate, 100 lbs. of nitrate of soda, 100 lbs. muriate potash, per acre, ½ spread before sowing, ½ when 2 or 3 inches high..............................	50	" ..	3½	" ..	5,800	32 40	60

SELECTED AND UNSELECTED SEED.

During the harvest season of 1900, the largest heads were selected from the standing grain of thirty-four varieties of wheat and six of barley. The seed was sown this year for a comparison with unselected seed from the same plots.

The plots were all the same size, viz., 1-20 acre, and each pair was sown in close proximity. The accompanying tables give the result of each individual variety and also a summary which shows great variation in the returns, the average, however, shows that the unselected wheat yielded 9 pounds per acre more than the selected, and the selected barley 1 bushel 32 pounds per acre more than the unselected.

The soil was a sandy loam, summer-fallowed. The plots of wheat were sown from the 1st to the 7th of May, and those of barley on the 17th of that month.

WHEAT.

Name of Variety.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
	Lbs.	Bush.	Lbs.	Lbs.
Goose—Selected	5,140	41	..	62
" Unselected	4,820	42	20	62½
Huron—Selected	5,120	37	..	61
" Unselected	4,720	35	20	59
White Fife—Selected	5,380	37	..	60
" Unselected	5,380	34	20	60
Blenheim—Selected	5,200	36	40	59
" Unselected	5,460	32	20	58
Dions—Selected	5,340	36	..	61
" Unselected	5,800	27	20	60
White Russian—Selected	3,460	36	..	59¾
" Unselected	5,880	36	..	58½
Progress—Selected	5,380	35	20	59
" Unselected	3,180	37	..	60
White Connell—Selected	5,400	35	..	60
" Unselected	5,400	34	..	59¼
Crown—Selected	5,520	34	40	59
" Unselected	5,020	38	..	59½
Admiral—Selected	5,340	34	20	59½
" Unselected	4,700	37	20	59½
Colorado—Selected	5,340	34	20	60½
" Unselected	6,420	31	20	59
Beauty—Selected	5,660	34	..	58
" Unselected	5,300	35	40	58½
Stanley—Selected	5,660	34	..	58½
" Unselected	5,080	36	..	59½
Red Fife—Selected	5,140	34	..	59
" Unselected	5,140	36	40	60
Preston—Selected	4,940	34	..	60
" Unselected	4,940	31	..	58½
Laurel—Selected	6,080	33	40	57½
" Unselected	6,040	35	..	56
Weldon—Selected	6,180	33	40	59½
" Unselected	5,840	31	40	59
Campbell's White Chaff—Selected	3,500	33	20	60
" " Unselected	3,640	33	..	59
Mason—Selected	4,720	33	..	60¼
" Unselected	3,680	31	..	61
Rideau—Selected	5,120	32	40	59½
" Unselected	3,760	33	..	59
Dawn—Selected	5,280	32	..	58¼
" Unselected	4,440	33	20	59½
Hungarian—Selected	5,200	31	40	59
" Unselected	4,660	29	40	59½
Captor—Selected	5,680	30	20	57¼
" Unselected	6,260	18	..	59
Dufferin—Selected	4,900	30	..	59
" Unselected	3,860	30	40	59
Alpha—Selected	5,600	30	..	58
" Unselected	5,640	35	..	59
Monarch—Selected	5,100	30	..	59
" Unselected	5,220	36	20	59½
Ladoga—Selected	5,000	30	..	59½
" Unselected	5,120	27	..	57
Clyde—Selected	5,720	29	40	58½
" Unselected	4,540	36	40	59½
Beaudry—Selected	5,520	29	40	60
" Unselected	5,360	25	40	58½
Percy—Selected	4,740	29	20	58¾
" Unselected	4,180	29	20	60
Wellman's Fife—Selected	7,040	29	..	58½
" Unselected	5,060	34	40	59½
Advance—Selected	5,420	28	..	59
" Unselected	5,180	34	20	59
Blue Stem—Selected	4,900	26	..	56
" Unselected	4,900	31	40	57¼
Red Swedish—Selected	5,320	24	40	58
" Unselected	4,880	24	20	59

Summary.	Bush.	Lbs.
Average yield of 34 varieties, selected	32	39
" " 34 " unselected	32	48

BARLEY.

Name of Variety.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
	Lbs.	Bush.	Lbs.	Lbs.
Odessa—Selected (1899)	3,800	50	..	46
" Unselected	3,300	26	32	45
Fulton—Selected	3,500	33	16	47
" Unselected	3,260	36	12	47
Harvey—Selected	3,320	28	36	48
" Unselected	4,060	42	24	48
Prize Prolific—Selected	2,910	20	30	46
" " Unselected	2,940	24	8	46
Sidney—Selected	2,860	19	28	47
" Unselected	3,460	25	40	47
Common—Selected	2,200	41	32	46½
" Unselected	3,200	29	8	46

Summary.	Bush.	Lbs.
Average yield of 6 varieties, selected	32	16
" " unselected	30	32

EXPERIMENT WITH SPELTZ.

This grain is still attracting considerable attention throughout the province, and numerous inquiries regarding it are received at the Experimental Farm.

A noticeable feature in connection with this grain during the past wet harvest, was the bright almost rust proof straw which remained quite bright in spite of the several weeks exposure in the stook. A stack of this straw has been saved for the purpose of testing its feeding value for cattle.

On rich summer-fallowed land the Speltz straw leaned badly, but not sufficient to prevent the binders from cutting all the way around the field.

The accompanying table gives the yield of Speltz, as compared with Red Fife wheat, American Beauty oats, and Mensury barley. The size of the plots was one-fortieth acre. The soil was a sandy loam, summer-fallowed.

In another part of this report will be found the particulars of the feeding value of this grain for steers.

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Weight of Straw per Acre.	Weight of Grain per Acre.
				Lbs.	Lbs.
Speltz Wheat	May 15	Aug. 29	106	4,720	3,080
Red Fife Wheat	" 15	" 28	105	6,460	1,720
American Beauty Oats	" 15	" 28	105	4,480	2,320
Mensury Barley	" 17	" 20	95	3,660	2,320

SPELTZ—THICK AND THIN SOWING.

The unusual size and formation of the berry of speltz causes much uncertainty regarding the most suitable manner of setting the grain drill. The accompanying table gives the result of setting the Massey-Harris Shoe Drill, one bushel, one and a half bushels, and one and three-quarter bushels per acre.

The size of the plots was one-twentieth acre, and the soil was a sandy loam, which had been summer-fallowed.

Speltz Wheat—Thick and Thin Sowing.

Name of Variety.	Drill set for.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Weight per Bushel.
	Per Acre.				Ins.		Ins.		Bush.	Lbs.	Lbs.
Speltz	1 Bushel	May 15	Sept. 6	114	43	Weak	3	Bearded	33	20	41
"	$1\frac{1}{2}$ "	" 15	" 6	114	43	"	3	"	37	20	43
"	$1\frac{3}{4}$ "	" 15	" 6	114	43	"	3	"	46		$43\frac{1}{2}$

Summer-fallowed vs. Unploughed Stubble for Speltz.

The small difference of yield in favour of the summer-fallow is no doubt largely attributable to the abundance of rain during the growing season. The test was made on plots of one-twentieth acre. The soil was a clay loam.

Variety.	How Prepared.	Date of Sowing.	Ripe.	Length of Straw.	Length of Head.	Yield per Acre.		Weight per Bushel.
				Inches.	Inches.	Bush.	Lbs.	Lbs.
Speltz	Stubble, unploughed.	May 15	Aug. 28	36	2	48	40	$41\frac{1}{2}$
"	Summer-fallow	" 15	" 29	47	2	51	20	44

ROTATION OF CROPS.

Two years ago, in accordance with your instructions, arrangements were made for a series of rotation plots, the principal object being the maintenance of the fertility of the soil, by ploughing under a leguminous crop every third year, instead of the usual summer-fallow.

The Soja beans were sown in rows 14 inches apart, using 60 pounds of seed per acre. The Red Clover was sown at the rate of 12 pounds per acre, and the mixed clovers in the proportion of 8 pounds of Alfalfa and 6 pounds of Alsike per acre. These leguminous plants were ploughed under when they reached their fullest development. The order of rotation is as follows :—

1899.	1900.	1901.
Soja Beans	Wheat	Oats.
Pease	Wheat	Wheat.
Tares	Wheat	Oats.
Red Clover	Wheat	Wheat.
Alfalfa and Alsike	Wheat	Barley.
Wheat	Oats	Soja Beans.
Wheat	Wheat	Pease.
Wheat	Oats	Tares.
Wheat	Wheat	Red Clover.
Wheat	Barley	Alfalfa and Alsike.
Oats	Soja Beans	Wheat.
Wheat	Pease	Wheat.
Oats	Tares	Wheat.
Wheat	Red Clover	Wheat.
Barley	Alfalfa and Alsike	Wheat.
Wheat	Wheat	Summer-fallow.
Wheat	Oats	"
Wheat	Barley	"
Wheat	Wheat	Oats.
Wheat	Barley	Oats.

Results of Third Year (1901) on Rotation Plots.

Plot.	Name of Variety.	Previous Crop.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Yield per Acre.	Weight per Bushel.
						Inches.	Bush. Lbs.	Lbs.
1	Oats—Banner	Wheat	May 8	Aug. 18	102	46	70 2	35
2	Wheat—Red Fife	Wheat	April 26	" 16	112	48	38 54	60
3	Oats—Banner	Wheat	May 8	" 18	102	47	73 24	34½
4	Wheat—Red Fife	Wheat	April 26	" 16	112	49	38 40	60
5	Barley	Wheat	May 22	" 17	87	37	37 2	46
6	Soja Beans	Oats	" 22	Ploughed	under	Aug. 12.		
7	Pease	Wheat	" 11	"	"	" 7.		
8	Tares	Oats	" 11	"	"	" 8.		
9	Red Clover	Wheat	" 22	"	"	" 9.		
10	Alfalfa and Alsike	Barley	" 22	"	"	" 10.		
11	Wheat—Red Fife	Soja Beans	April 26	Aug. 17	113	45	38 18	60
12	Wheat "	Pease	" 26	" 17	113	47	37 6	60
13	Wheat "	Tares	" 26	" 17	113	47	39 22	60
14	Wheat "	Red Clover	" 26	" 17	113	44	25 18	60
15	Wheat "	Alfalfa and Alsike	" 26	" 17	113	47	28 42	60
16	Summer-fallow	Wheat						
17	"	Oats						
18	"	Barley						
19	Oats—Banner	Wheat	May 8	Aug. 17	101	49	51 30	40
20	Oats "	Barley	" 8	" 17	101	45	55 ..	40½

SUMMARY OF RESULTS FOR THREE YEARS.

Plot.	Variety.	Yield per Acre.		Variety.	Yield Per Acre.		Variety.	Yield per Acre.	
	1899.	Bush.	Lbs.	1900.	Bush.	Lbs.	1901.	Bush.	Lbs.
1	Soja Beans.... ...			Wheat—Red Fife...	27	42	Oats—Banner.	70	2
2	Tease, Golden Vine			Wheat "	23	42	Wheat—Red Fife...	38	54
3	Pares..............	Ploughed		Wheat "	25	4	Oats—Banner.......	73	24
4	Red Clover.		under.	Wheat " ...	15	14	Wheat—Red Fife...	38	40
5	Alfalfa and Alsike			Wheat "	11	42	Barley—Mensury....	37	2
6	Wheat—Red Fife.	27	44	Oats—Banner.	18	32	Soja Beans........		
7	Wheat " ..	29	8	Wheat—Red Fife...	8	26	Pease, Golden Vine		
8	Wheat " ..	27	2	Oats—Banner......	26	22	Tares..............	Ploughed	
9	Wheat " ..	21	0	Wheat—Red Fife...	6	12	Red Clover........		under.
10	Wheat " ..	26	54	Barley—Odessa.....	12	44	Alfalfa and Alsike.		
11	Oats—Bavarian...	27	44	Soja Beans..			Wheat—Red Fife...	38	18
12	Wheat—Red Fife.	27	20	Pease, Golden Vine			Wheat "	37	6
13	Oats—Bavarian..	26	46	Taies......	Ploughed		Wheat "	39	22
14	Wheat—Red Fife.	27	30	Red Clover........		under.	Wheat "	25	18
15	Barley—Odessa....	38	38	Alfalfa and Alsike.			Wheat "	28	42
16	Wheat—Red Fife.	28	8	Wheat—Red Fife...	7	34	Summer-fallow......		
17	Wheat " ..	29	16	Oats—Banner.......	33	12	"		
18	Wheat " ..	24	2	Barley—Odessa.....	15	32	"		
19	Wheat " ..	26	32	Wheat—Red Fife...	6	48	Oats—Banner.......	51	30
20	Wheat " ..	27	12	Barley, Odessa	16	44	Oats "	55	..

SUMMARY.

Although further time will be required before any definite conclusions can be drawn regarding the principal object of this experiment, there are already some suggestive results.

Better returns were obtained in both this and last year from ploughing under annual leguminous crops than from ploughing under clovers.

Plots one and three have each given more pounds of the same kind of grain in two years than No. 19 has in three years.

EXPERIMENTS WITH OATS.

Generally speaking, the oat crop throughout the province is above the average. On the Experimental Farm the yield has been good and the straw stiff, but the sample, owing to rust, is somewhat lighter than usual.

All the seed was treated with formalin, and there was a total absence of smut.

The newly introduced 'Tartar King Oat' is a new white, sided variety with a remarkably stiff straw, and very handsome in appearance, but the yield, both in the field and the smaller plots, is somewhat disappointing.

Another distinct new variety is 'Goldfinder Oats.' It has a somewhat thin and yellow oat, with a good stiff straw. The yield this year was better than that of the Tartar King, but not equal to many of the other varieties.

Average yields of twelve of the most promising varieties are also given. It will be noticed that Banner leads in productiveness.

The tests were made with sixty-five varieties, on plots of one-twentieth acre each. The soil was a sandy loam, summer-fallowed, and 2 bushels of seed was used per acre, sown with a drill.

Salzer's Big 4 and Milford were sown on June 1, and all the other varieties from May 10 to 13.

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.	
Early Maine	Aug. 23	102	48	Fair	10	Branching	3,120	91	26	34½	Badly.
Improved American	″ 23	102	55	Stiff	10	″	4,640	90	..	35	Slightly.
White Giant	″ 24	103	56	Fair	10	″	4,960	89	14	33	Badly.
Danish Island	″ 22	101	56	Stiff	9	″	4,060	89	14	35	Slightly.
Wide Awake	″ 24	103	51	″	8	″	4,460	89	14	36	″
Siberian	″ 22	101	55	″	12	″	4,880	88	28	35	Badly.
Golden Beauty	″ 25	104	46	″	9	″	3,980	88	28	36	Slightly.
American Triumph	″ 22	101	51	Fair	9	″	3,940	87	2	34½	″
White Schonen	″ 22	101	50	″	10	″	4,640	87	2	37	″
Wallis	″ 24	103	50	Stiff	11	″	2,180	86	16	36	Badly.
Lincoln	″ 22	101	50	″	9	″	4,280	85	30	35	″
Banner	″ 24	103	55	Fair	12	″	4,700	85	10	34	Slightly.
Irish Victor	″ 20	99	48	Stiff	8	″	4,120	84	24	34½	″
Columbus	″ 20	99	46	Weak	8	″	4,440	84	4	35½	Badly.
Bavarian	″ 22	101	54	Stiff	9	″	3,940	84	4	36	″
Abundance	″ 23	102	54	″	12	″	4,360	83	18	36	Slightly.
Golden Tartarian	″ 27	106	50	″	11	Sided.	4,780	82	32	32	Badly.
Holstein Prolific	″ 23	102	50	Fair	9	Branching	4,340	81	26	36½	Slightly.
Hazlett's Seizure	″ 14	93	50	″	12	″	4,640	81	6	37	Badly.
Improved Ligowo	″ 20	99	50	″	11	″	3,940	81	6	37	″
Mennonite	″ 22	101	48	″	10	″	3,980	80	..	33½	″
American Beauty	″ 20	99	48	″	11	″	4,200	79	14	35½	Slightly.
New Zealand	″ 26	105	56	Stiff	12	Sided	5,440	78	8	38½	None.
Waverley	″ 25	104	55	″	11	Branching	4,640	78	8	35	Badly.
Rosedale	″ 25	104	60	″	12½	Sided	3,100	76	16	37½	Slightly.
Sensation	″ 20	102	55	Fair	10	Branching	3,640	75	10	39	Badly.
Early Gothland	″ 25	104	55	Stiff	10½	Sided	5,440	75	10	38	Slightly.
Early Blossom	″ 25	104	52	″	10	″	5,360	74	24	34½	″
Buckbee's Illinois	″ 27	106	56	″	11	Branching	5,500	73	18	34½	Badly.
Early Archangel	″ 22	101	50	″	9	″	4,300	73	18	37	Slightly.
Goldfinder	″ 28	110	58	″	12½	Sided	4,900	73	18	38	Badly.
Cream Egyptian	″ 11	90	48	″	8	″	4,140	72	12	40	″
Oderbruch	″ 25	104	52	Fair	9	″	3,160	71	26	34	″
Russell	″ 25	104	54	″	12½	Branching	4,880	71	6	33	″
Kendal	″ 28	110	57	Stiff	10½	Sided	5,200	70	20	36	″
Abyssinia	″ 23	102	52	Fair	10½	Sided	4,700	70	20	37	″
Olive	″ 27	109	57	″	11	″	5,120	70	..	35	″
Golden Giant	″ 27	106	51	Stiff	12	″	4,220	70	..	34¼	″
Miller	″ 25	104	50	Fair	10	Branching	5,220	70	..	33½	″
Bonanza	″ 10	89	44	″	7	″	3,740	69	14	42	″
White Wonder	″ 13	92	50	Weak	11	″	4,240	69	14	40	″
California Prolific Black	″ 28	110	57	Stiff	10	Sided	5,440	69	14	32	″
White Russian	″ 22	101	54	Weak	9	Branching	4,540	69	14	36	″
Joanette	″ 28	110	48	″	10	″	4,660	68	28	34	″
Newmarket	″ 23	102	48	Stiff	12	″	3,480	68	8	37½	Slightly.
Thousand Dollar	″ 23	102	52	Fair	9	″	3,680	68	8	34½	Badly.
Holland	″ 31	110	54	Stiff	12	Sided	4,900	67	22	30	″
Early Golden Prolific	″ 25	104	54	Fair	10	Branching	3,620	67	2	34½	″
Master	″ 23	102	52	Stiff	12½	Sided	4,340	66	16	36½	Slightly.
King	″ 26	105	50	Fair	12	Branching	5,260	65	30	34½	Badly.
Oxford	″ 23	102	53	Stiff	12½	Sided	4,360	65	30	37	Slightly.
Cromwell	″ 22	101	56	Weak	12	″	5,280	65	10	33	Badly.
Black Mesdag	″ 12	94	50	″	9	Branching	3,800	64	24	35½	″
Salines	″ 26	105	54	Stiff	11	″	4,340	63	18	33	Slightly.
Prize Cluster	″ 13	92	52	Weak	10	″	4,340	63	18	40	Badly.
Brandon	″ 24	103	44	Stiff	8½	Sided.	4,680	62	12	36½	″
Pioneer	″ 22	101	46	″	10	Branching	4,700	61	26	37	″
Prolific Black Tartarian	″ 25	107	51	″	9	Sided	5,440	60	20	32	Slightly.
Salzer's Big 4	″ 31	91	50	Weak	8	Branching	2,120	60	20	34	Badly.
Pense	″ 28	110	51	Stiff	10½	Sided	5,480	59	14	32	″
Tartar King	″ 22	101	49	″	10	Sided	3,800	58	28	34	Slightly.
Black Beauty	″ 26	108	52	Weak	12	Branching	4,740	57	22	33	Badly.
Flying Scotchman	″ 20	99	51	Stiff	12	″	4,140	57	22	37½	Slightly.
Scotch Potato	″ 26	105	52	″	12	″	5,660	45	10	33½	Badly.
Milford	Sept. 7	98	45	″	8½	Sided	4,820	31	6	18	″

Average Results of a Five Years' Test of Eight Varieties of Oats.

Variety.	Years included.	Average Yield Per acre.	
		Bush.	Lbs.
Banner	1896-97-98-99-1901	91	..
Golden Beauty	1896-97-98-99-1901	83	26
Early Golden Prolific	1896-97-98-99-1901	83	14
White Schonen	1896 97-98-99-1901	81	30
Holstein Prolific	1896-97-98-99-1901	81	..
Abundance	1896-97-98-99-1901	78	32
Improved Ligowo	1896-97-98-99-1901	75	26
Master	1896-97-98 99-1901	72	2

Field Plots of Oats.

These were all sown on summer-fallow, with a drill, in the proportion of two bushels of seed per acre.

Variety.	Character of Soil.	Size of Plot.	Date Sown.	Date Ripe.	Number Days Maturing.	Yield per acre.	
		Acres.				Bush.	Lbs.
Ligowo Oats	Sandy loam	5	Apl. 25	Aug. 16	114	59	9
American Beauty	"	3	May 1	" 19	110	49	2
Tartar King	Clay loam	3	" 9	" 21	104	59	18
Waverley	"	3	" 14	" 25	103	69	9
Banner	Sandy loam	3	" 8	" 20	104	68	18
Abundance	"	2	" 1	" 20	111	75	9
Goldfinder	Clay loam	1	" 14	" 31	109	63	10

EXPERIMENTS WITH BARLEY.

Fifty-two varieties of barley were tested this year. The yield of nearly all the varieties was greatly lessened by rust, which attacked the plants very early this year. It was particularly bad in two-rowed sorts, discolouring the straw and shrivelling up the head.

Mensury, the leading variety for productiveness, has proved itself one of the best for this district. The plant is vigorous, the straw stiff and usually free from rust.

The Hulless varieties, both black and white, are just now being recommended highly, by interested parties, but these sorts have not proved satisfactory here. The straw is very weak and the yield of grain below many other kinds.

The two beardless varieties, Excelsior and Success, are also unsuitable for this province. The straw is very brittle, and owing to excessive and late stooling, the crop of grain ripens unevenly, and is light in weight.

The size of plots used for this test of varieties was one-twentieth acre. The soil was a sandy loam which had been summer-fallowed. All were sown on May 17 and 18, in the proportion of two bushels of seed per acre.

Barley—Six Rowed—Test of Varieties.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.	Lbs.	Bush.	Lbs.	Lbs.	
Mensury	Aug. 20	95	41	Stiff	3½	3,660	48	16	46	Slightly.
Mansfield	" 12	87	44	"	3	3,100	47	24	46	"
Yale	" 16	91	39	Fair	3	3,640	47	4	46	Badly.
Garfield	" 20	95	40	Stiff	3½	3,180	46	12	47	"
Albert	" 12	87	38	Fair	2½	2,860	44	8	47	Considerably.
Phoenix	" 12	87	34	Stiff	4	2,760	44	8	49½	Slightly.
Argyle	" 16	91	42	Fair	3	4,100	43	36	47	Badly.
Petschora	" 16	91	38	Stiff	3½	3,000	41	32	47	"
Excelsior	" 12	87	46	"	3	3,140	40	40	41	"
Claude	" 20	95	49	"	3	3,840	38	36	47	"
Summit	" 16	91	39	"	3	3,200	37	24	47	"
Baxter	" 16	91	43	Weak	3	3,000	37	24	48	"
Hulless Black	" 18	93	40	"	3	3,520	36	32	61	"
Nugent	" 19	94	37	Stiff	2½	2,080	33	36	47	"
Royal	" 16	91	34	"	3½	2,580	33	36	47	"
Empire	" 20	95	36	"	3	2,600	33	16	46½	Slightly.
Blue Long Head	" 20	95	33	"	3½	2,800	33	16	46	Badly.
Surprise	" 19	94	36	"	2½	3,160	32	4	47	"
Rennie's Imp'v'd	" 17	92	43	Weak	2½	3,660	32	4	47½	"
Champion	" 13	88	37	Stiff	2½	2,200	30	40	41	Slightly.
Vanguard	" 14	89	41	"	3½	2,980	29	28	47	Badly.
Oderbruch	" 17	92	41	Weak	2	3,160	29	28	46	"
Success	" 18	93	42	"	2	2,660	29	28	40	Slightly.
Common	" 14	89	41	"	3	3,200	29	8	46	Badly.
Trooper	" 20	95	36	Fair	3	3,800	29	8	46	"
Brome	" 20	95	36	Weak	3	3,160	27	44	48	"
Pioneer	" 15	90	39	Stiff	3	3,880	27	24	49	"
Odessa	" 18	93	39	Weak	3½	3,300	26	32	45	"
Stella	" 20	95	37	Fair	3	3,460	21	32	47	"
Hulless White	" 12	87	32	Weak	2½	2,100	16	12	55	"

Barley—Two Rowed—Test of Varieties.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		Inches.	Lbs.	Bush.	Lbs.	Lbs.	
Jarvis	Aug. 16	91	47	Fair	4	3,480	47	44	47	Slightly.
Gordon	" 20	95	44	Stiff	3	3,180	43	36	46½	Badly.
Harvey	" 20	94	43	Weak	4	4,060	42	24	48	"
Dunham	" 16	91	40	"	4	3,700	41	32	48	"
Clifford	" 16	91	43	Fair	4	3,120	39	8	48	"
Fulton	" 20	94	40	Stiff	3	3,260	36	12	47	Slightly.
Logan	" 22	96	44	"	4	3,400	35	20	48	Badly.
Leslie	" 18	93	44	Fair	4½	2,800	35	20	50	"
Nepean	" 18	93	48	Weak	3½	3,880	31	32	47	"
Standwell	" 22	96	38	Stiff	3	2,840	30	20	47	"
Invincible	" 20	95	42	Fair	4	2,700	29	8	49	"
Kirby	" 19	94	40	Weak	3½	3,340	28	16	49	"
Victor	" 17	92	43	"	4	3,760	27	44	48½	"
Canadian Thorpe	" 20	95	45	Stiff	4	3,490	27	14	48	"
Bolton	" 15	90	34	Weak	4	3,640	26	12	48	"
Sidney	" 16	90	39	"	3½	3,460	25	40	47	"
Prize Prolific	" 22	96	39	"	3	2,940	24	8	46	"
French Chevalier	" 22	97	39	Stiff	4½	2,560	23	36	46	"
Newton	" 22	97	30	"	3	1,860	19	28	48	"
Danish Chevalier	" 22	96	32	Fair	4	3,280	19	8	45½	"
Beaver	" 22	96	30	Stiff	4	3,100	18	36	47½	"
Kinver Chevalier	" 22	97	36	Fair	4	3,060	17	24	44½	"

AVERAGE Results of a Five Years' Test of Twelve Varieties of Barley.

Name of Variety.	Years included.	Average Yield per Acre.	
		Bush.	Lbs.
Mensury	1896-97-98-99-1901	51	12
Trooper	1896-97-98-99-1901	50	..
Common	1896-97-98-99-1901	49	14
Phœnix	1896-97-98-99-1901	46	46
Nugent	1896-97-98-99-1901	46	32
Excelsior	1896-97-98-99-1901	45	14
Stella	1896-97-98-99-1901	44	26
Royal	1896-97-98-99-1901	43	32
Champion	1896-97-98-99-1901	43	6
Bolton	1896-97-98-99-1901	42	44
Newton	1896-97-98-99-1901	40	42
Danish Chevalier	1896-97-98-99-1901	35	34

FIELD PLOTS OF BARLEY.

All these were sown on summer-fallow ; soil clay-loam ; sown at the rate of two bushels of seed per acre.

Variety.	Character of Soil.	Size of Plot.	Date Sown.	Date Ripe.	Number Days Maturing.	Yield per Acre.	
		Acres.				Bush.	Lbs.
Mensury	Clay loam	3	May 20	Aug. 21	93	43	45
Bolton	"	2	" 21	" 14	85	34	19
Beaver	"	1	" 21	" 19	90	55	15
Invincible	"	½	" 21	" 19	90	32	46

SMUT PREVENTIVES FOR BARLEY.

This grain has been found the most difficult of all to treat successfully for smut. In certain seasons it seems very difficult to destroy the spores of this fungus. From the accompanying table in will be seen that the best results have been obtained this season from treatment with bluestone (sulphate of copper).

It is claimed that formalin gives the best results when the grain is covered with canvas for some hours after treatment, but judging from a comparison of plots No. 3 and No. 4, there was no apparent benefit from this method.

A series of experiments was also conducted in testing preventives of smut in wheat and oats, but all the plots, both treated and untreated, were this year equally free from smut.

Name of Variety.	How Treated.	Good Heads on 9 sq. ft.	Smutty Heads on 9 sq. ft.
Phœnix Barley	Steeped for 1 hour, in 1 lb. bluestone to 3 pails water, and dried	475	2
"	" " 4½ oz. formalin to 10 galls. water, and dried	480	52
"	Sprinkled with 9 oz. formalin to 10 galls. water, and dried	410	35
"	" 9 " " covered	400	36
"	" 1 lb. bluestone to 1 pail of water, and dried	410	00

EXPERIMENTS WITH PEASE.

The yield of pease this year was not quite an average one, but the sample was excellent, and with the exception of four varieties, the experiment was a very successful test of varieties.

Chancellor, Kent, Agnes and Mackay, were all more or less injured by cutworms.

From the accompanying table it will be seen that pease are quite productive here. There is an absence of pea-weevil, and were it not for the labour of harvesting, this crop would prove very remunerative.

The land was summer-fallowed the previous year. The plots were one-twentieth of an acre, and the soil a rich clay loam. All the varieties, fifty-seven in number, were sown from May 4 to May 8.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				In.	In.		Bush.	Lbs.	Lbs.
Paragon	Sept. 2	121	Fair	58	2½	Medium	43	..	65½
Gregory	" 7	126	Rank	68	3	Large	42	30	65½
Macoun	" 10	127	"	48	3	Medium	41	40	64½
Picton	Aug. 30	115	Fair	84	3	Large	41	20	65
Victoria	Sept. 9	126	Rank	75	3	"	41	20	62
New Potter	" 11	130	"	51	3	"	41	20	64½
Mummy	" 5	122	Fair	48	2½	Small	39	40	62½
King	Aug. 28	116	Rank	46	2½	Medium	38	50	65
German White	" 29	117	Fair	68	3	"	38	40	64½
Crown	Sept. 7	124	Weak	54	2½	Small	38	30	65½
Elliot	" 6	125	"	48	3	Large	38	30	64
Prince	" 7	126	Rank	84	3	"	38	..	64½
Alma	Aug. 29	114	Fair	65	2¼	Small	37	20	65
Fenton	Sept. 2	119	Medium	54	3	Large	36	40	64
Early Britain	Aug. 29	117	Weak	44	3	Medium	36	20	61½
Prussian Blue	" 27	115	Rank	63	2½	"	36	20	65½
Nelson	" 20	108	Fair	40	3½	"	36	10	66
Cooper	Sept. 3	122	Rank	56	2½	"	36	..	65
Arthur	Aug. 27	115	Fair	43	6	"	35	50	65
Perth	" 30	118	Weak	48	2½	Large	35	40	64
Duke	" 21	105	Rank	66	3	"	35	20	64
Harrison's Glory	" 31	116	Fair	54	2¼	Small	35	..	65
Golden Vine	" 31	119	Weak	52	2½	"	35	..	64½
Carleton	Sept. 7	124	Fair	60	2¾	"	34	50	64
Canadian Beauty	" 7	126	Rank	80	2½	Large	34	40	64
Chelsea	" 6	123	Fair	54	3	Medium	34	20	62
Archer	" 7	124	"	51	3	Small	34	20	65
Pride	Aug. 31	119	"	35	3	Medium	34	20	64
Lanark	Sept. 2	121	Weak	52	3	Large	33	50	63½
Wisconsin Blue	Aug. 31	116	Fair	54	2½	Medium	33	30	66
Oddfellow	" 26	111	"	48	2	"	33	20	67
White Wonder	" 20	108	"	20	3	"	33	20	63
Agnes	" 31	119	Weak	48	2½	Large	33	10	62½
Dover	Sept. 8	125	Fair	68	2½	Medium	33	..	64
French Canner	Aug. 20	108	"	50	3¼	Small	33	..	65
Grass	Sept. 10	127	"	66	2	"	32	20	63
Trilby	" 10	127	Rank	72	2½	Medium	32	..	62½
Vincent	Aug. 20	104	Fair	55	3	Large	32	..	63½
Creeper	" 19	103	"	60	2½	Small	31	50	65
Bruce	" 29	113	"	50	3	Medium	31	50	65
Kent	Sept. 7	124	Weak	36	3	Large	31	..	64
Large White Marrowfat	" 10	127	Rank	72	3	"	31	..	63
Prince Albert	" 11	130	"	73	2½	Small	31	..	63
Chancellor	Aug. 26	111	Weak	36	2½	Medium	30	40	64½
Bedford	Sept. 2	119	Rank	63	2¾	Small	30	20	65
Black-eyed Marrowfat	Aug. 21	105	"	70	3	Medium	30	..	64½
English Grey	Sept. 10	127	Fair	48	3	"	29	50	61½
Centennial	" 10	129	Rank	62	3	"	29	50	64
Daniel O'Rourke	Aug. 30	116	Fair	69	3	Small	29	40	65
Fergus	" 20	104	Rank	86	3	"	29	40	65
Mackay	Sept. 7	124	"	51	3	Large	29	..	63
Multiplier	" 10	127	Fair	70	2½	Small	28	40	62½
Herald	" 7	124	"	51	2¾	"	28	30	64
Elephant Blue	" 8	127	Rank	63	3	Medium	28	20	64
Pearl	" 7	126	"	78	3	Small	27	20	64
Bright	" 9	128	"	79	3	Medium	25	40	65
Elder	" 10	129	"	76	2½	Small	16	30	64½

Average Results of a Five Years' Test of Twelve Varieties of Pease.

Variety.	Years included.	Average Yield per Acre. Bush.	Lbs.
Mummy	1896-97-98-99-1901	45	54
New Potter	1896-97-98-99-1901	44	48
Carleton	1896-97-98-99-1901	44	46
Pride	1896-97-98-99-1901	44	2
Kent	1896-97-98-99-1901	42	32
Mackay	1896-97-98-99-1901	42	8
Trilby	1896-97-98-99-1901	42	4
Crown	1896-97-98-99-1901	40	14
Prince	1896-97-98-99-1901	39	8
Prince Albert	1896-97-98-99-1901	38	54
Agnes	1896-97-98-99-1901	38	38
Creeper	1896-97-98-99-1901	36	42

Mixed Pease and Oats.

The labour of harvesting pease in the usual way, added to the risk of loss from severe wind storms, has always proved a serious obstacle to their cultivation in this province.

A small quantity of oats, mixed with the pease at seeding, usually keeps the combined crop from lodging, and permits of a large proportion of the crop being secured with a binder, and stooked and threshed in the usual manner. The small quantity of pease missed by the binder can be gathered by the store hogs, usually plentiful at this season of the year.

The size of plots in this test was one-twentieth acre, and the soil was a sandy loam, summer-fallowed.

Quantity of Peas sown per Acre.	Quantity of Oats sown per Acre.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Total Yield per Acre. Bush.	Lbs.	Weight per Bushel. Lbs.
2 bushel	1 peck	May 6	Aug. 27	113	46	20	43
2 "	2 "	" 6	" 27	113	57	20	38

Thick and Thin Sowing of Pease.

It is usually difficult to get a close stand of pease in this country. For this reason, it was expected that a somewhat heavier sowing than usually practised in the East would give the best results, but the result of this year's test does not appear to confirm this opinion.

The size of the plots for this test was one-twentieth acre, the soil was a sandy loam, summer-fallowed, and all were sown on May 8.

Name of Variety.	Amount of Seed sown per Acre.	Character of Soil.	Size of Plot.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Size of Pea.	Total Yield per Acre.	
	Bush.		Acre.					In.	Lbs		Bush.	Lbs.
Potter..........	2	Sand loam	$\frac{1}{20}$	May 8	Aug. 29	113	Fair....	60	$2\frac{1}{2}$	Medium..	33	40
"	$2\frac{1}{2}$	" ..	$\frac{1}{20}$	" 8	" 29	113	"	60	$2\frac{1}{2}$	" ..	33	40
"	3	" ..	$\frac{1}{20}$	" 8	" 29	113	"	60	$2\frac{1}{2}$	" ..	32	20

THICK AND THIN SEEDING OF FLAX.

The size of the plots for the test was one-twentieth acre, the soil was a sandy loam which had been summer-fallowed.

The accompanying table gives the second sowing for this test. The first plots were sown on May 16, and were destroyed by cutworm.

Variety.	Amount of Seed sown per Acre.	Date of Sowing.	Length of Straw.	Date when Pulled for Fibre.	Weight of Straw per Acre.	Yield of Seed per Acre.		Weight per Bushel.
	Lbs.		In.		Lbs.	Bush.	Lbs.	Lbs.
Flax	40	May 31..	26	Sept. 5....	2,800	14	56	56
"	30	" 31..	26	" 5....	2,200	11	44	56
"	20	" 31..	26	" 5. ..	2,400	11	14	56

BUCKWHEAT—A VOLUNTEER CROP.

One of the objections to the cultivation of buckwheat in this country is the fact that the grain ripens so unevenly that the first-formed grain shells before the rest is fully matured, and the shelled grain, coming up in the next year's crops, injures the samples.

The shelled grain in last year's buckwheat plots was lightly covered this spring, and the yield, as will be seen by the following tables, was a good one.

Variety.	Date Sown.	Date of Ripening.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Lbs.	Bush.	Lbs.	Lbs.
Japanese	Autumn, 1900.........	Sept. 16..	220	28	19	47
Gray............................	" 1900.......	" 16..	500	35	20	$48\frac{1}{2}$
Silver Hull........................	" 1900.......	" 16..	440	32	32	52

EXPERIMENTS WITH INDIAN CORN.

Fodder corn was somewhat later in maturing this year, but the crop was an average one.

North Dakota White and Pearce's Prolific, the two varieties which seem most desirable for this part of the province, both reached the late milk or roasting stage on September 1. The fields of these varieties grown for ensilage gave a very satisfactory yield. The corn was cut with a binder, and allowed to wilt for several days before being put into the silos, and already the ensilage is giving off an agreeable, malty odor, indicating good quality.

The seed was sown on May 29, in rows 30 inches apart, using about half a bushel of seed per acre. The crop was cut on September 5. Thirty-four varieties were under trial. The soil was a rich, black loam, which had been summer-fallowed. The yield was calculated from two rows, each 66 feet long.

INDIAN CORN—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	Height.	Leafiness.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when cut.	Weight per acre grown in rows.		Weight per acre grown in hills.	
		In.							Tons.	Lbs.	Tons.	Lbs.
Thoroughbred White Flint......	Rank.	99	Leafy	Aug. 22	Aug. 31	Sept. 4	......	E. Milk..	23	860	20	260
Salzer's All Gold...	Fair..	111	Little	" 19	" 27	Aug. 31	Sept. 5	L. " ..	23	464	19	1,072
Yellow Long Eared	"	104	Leafy	" 13	" 20	" 29	" 1	L. " ..	21	1,956	17	716
N'rth Dakota White	"	81	Very leafy	" 16	" 22	" 27	Aug. 31	L. " ..	20	1,448	16	1,660
Pearce's Prolific....	Rank.	96	Leafy	" 12	" 18	" 25	Sept. 1	L. " ..	20	1,184	17	1,772
Sanford	Fair ..	93	"	" 13	" 21	Sept. 4	......	E. " ..	20	920	14	1,436
Pride of the North.	"	96	Little	" 20	" 25	Aug. 27	......	E. " ..	20	656	19	1,600
Mammoth Eight Rowed Flint.....	Rank.	94	Leafy	" 12	" 20	Sept. 4	......	E. " ..	19	1,732	17	320
Extra Early Huron Dent............	Fair ..	99	Little ...	" 17	" 25	Aug. 30	......	E. " ..	19	1,600	21	1,560
Red Cob Ensilage..	Rank.	115	Little	" 29	Sept. 5	......	......	Silk	19	1,600	20	1,052
Longfellow	"	99	Leafy ...	" 11	Aug. 17	Aug. 27	Sept. 5	L. Milk..	19	1,204	17	1,904
Salzer's Superior Fodder..........	Fair ..	118	Fairly...	" 22	Sept. 5	......	.....	Silk......	19	940	21	1,692
Mammoth Cuban..	Rank.	104	Little ..	" 22	Aug. 30	Sept. 5	.....	E. Milk..	19	280	22	484
Giant Prolific Ensilage..........	"	101	Fairly....	" 27	" 31	" 5	.....	E. " ..	18	1,752	18	1,752
Selected Leaming..	Fair ..	107	Little ...	" 17	" 22	Aug. 28	Aug. 31	L. " ..	18	1,752	19	1,336
Champion White Pearl.........	"	101	"	" 21	" 31	Sept. 4	.....	E. " ..	18	1,356	18	960
White Cap Yellow Dent............	"	106	Fairly....	" 18	" 26	Aug. 31	Sept. 5	L. " ..	18	1,224	17	1,772
Evergreen Sugar...	Rank.	87	Fairly....	" 20	" 30	Sept. 5	......	E. " ..	18	1,092	15	888
King of the Earliest	Fair. .	90	Little	" 20	" 17	" 26	Aug. 31	L. " ..	18	564	17	848
Cloud's Early Yellow	"	113	"	" 21	" 27	" 4	.....	E. " ..	18	300	20	656
Black Mexican.....	"	82	Fairly....	" 17	" 25	Aug. 30	Sept. 5	L. " ..	18	168	20	260
North Dakota Yellow.............	"	92	Very leafy	" 12	" 19	" 28	" 1	L. " ..	17	1,904	19	16
Early Butler.....	"	96	Little.....	" 18	" 28	" 30	....	E. " ..	17	1,376	20	1,316
Early Mastodon...	"	108	"	" 21	" 30	Sept. 5	.....	E. " ..	17	1,112	16	1,264
Compton's Early...	Rank.	90	Very leafy	" 11	" 18	" 27	Sept. 5	L. " ..	17	980	17	1,376
Kendall's Early Giant	Fair ..	72	Fairly....	" 10	" 17	" 27	Aug. 31	L. " ..	17	452	15	96
Country Gentleman	"	78	Little	" 20	" 28	" 30	......	E. " ..	16	1,660	14	1,832
Canada White Flint	"	107	Leafy	" 12	" 20	" 29	Sept. 5	L. " ..	16	1,660	17	188
Angel of Midnight.	"	97	Very leafy	" 16	" 25	Sept. 3	....	E. " ..	15	1,152	15	1,548
Mitchell's Extra Early	Weak	62	Fairly....	" 2	" 7	Aug. 20	Aug. 28	L. " ..	14	512	16	1,396
Black Mexican.....	"	72	"	" 7	" 12	" 26	" 27	L. " ..	11	1,496	13	928
Salzer's Earliest Ripe	"	69	Slight....	" 2	" 7	" 16	" 25	L. " ..	11	1,364	16	1,264
Extra Early Szekely	"	80	Fairly....	" 7	" 10	" 20	" 27	L. " ..	11	704	9	84
Yellow Six-Weeks.	Fair ..	69	Little ...	" 7	" 11	" 20	" 29	L. " ..	11	176	11	1,760

INDIAN Corn Sown at Different Distances Apart.

Name of Variety.	Distance between Rows.	Height.	Condition when Cut.	Weight per Acre, green, in Rows.	
	Inches.	Inches.		Tons.	lbs.
Longfellow	21	94	Early milk	16	1,616
"	28	94	"	16	1,377
"	35	94	"	16	1,943
"	42	94	"	17	603
Selected Leaming	21	101	"	19	527
"	28	101	"	15	1,538
"	35	101	"	15	548
"	42	101	"	15	548
Champion White Pearl	21	115	"	17	953
"	28	115	"	15	407
"	35	115	"	15	548
"	42	115	"	16	1,660

Average Yield at Different Distances Apart.	In Rows.	
	Tons.	lbs.
Average yield of green corn, 21 inches apart	17	1,698
" " 28 "	15	1,774
" " 35 "	16	346
" " 42 "	16	937

FIELD ROOTS.

All field roots, with the exception of carrots, have given large returns ; for some unexplained reason carrots were generally quite small.

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties of turnips were sown, but one of them, 'Webb's New Renown,' rotted in the ground and returns could not be obtained. With this exception the quality of the roots was excellent.

The soil chosen for these experiments was a sandy loam, which had been manured two years ago, and was summer-fallowed last year.

Two sowings were made of each variety, in every instance the early sown plots yielded considerably more than those later sown.

The first plots were sown on May 16, the second on May 30, and the roots from both were pulled on October 12. The estimate of yield has been made from the product of two rows each 66 feet long.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	Yield Per Acre. — 1st Plot.		Yield Per Acre. — 1st Plot.		Yield Per Acre. — 2nd Plot.		Yield Per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Hall's Westbury	31	1,624	1,060	24	16	1,792	563	12
Hartley's Bronze	30	1,512	1,025	12	15	1,680	528	..
Prize Winner	30	720	1,012	..	17	320	572	..
Mammoth Clyde	27	1,704	928	24	15	360	506	..
Prize Purple Top	26	1,064	884	24	14	1,040	484	..
New Arctic	26	536	875	36	11	1,760	396	..
Sutton's Champion	26	272	871	12	13	400	440	..
Magnum Bonum	26	8	866	48	12	1,872	431	12
Imperial Swede	25	1,744	862	24	14	776	479	36
Kangaroo	25	424	840	24	9	1,536	325	36
Elephant's Master	24	1,368	822	48	10	328	338	48
East Lothian	24	576	809	36	12	552	409	12
Carter's Elephant	24	312	805	12	9	1,800	330	..
Perfection Swede	24	312	805	12	16	1,264	554	24
Bangholm Selected	23	1,784	796	24	13	1,984	466	24
Skirving's	23	464	774	24	14	1,040	484	..
Shamrock Purple Top	23	200	770	..	15	1,944	532	24
Jumbo	22	1,408	756	48	8	1,160	286	..
Halewood's Bronze Top	22	616	730	26	13	1,720	462	..
Monarch	21	1,560	726	..	13	400	440	..
Giant King	21	1,296	721	36	7	1,312	255	12
West Norfolk Red Top	20	920	682	..	11	1,760	396	..
Marquis of Lorne	19	1,864	664	24	11	176	369	36
Drummond Purple Top	19	280	638	..	6	1,200	220	..
Selected Purple Top	17	1,640	594	..	11	176	369	36
Selected Champion	17	1,640	594	..	12	1,872	431	12
Emperor	15	1.944	532	24	12	1,080	418	..
Champion Purple Top	14	1,568	492	48	13	1,984	466	24
Webb's New Renown	Completely		destroyed by		rot.			

EXPERIMENTS WITH MANGELS.

Twenty-five varieties of mangels were tested this year, and the yield was slightly above the average.

The seed of some of the varieties was washed out by a heavy rain, soon after sowing, leaving large vacancies in the rows. This accounts for the small return given by the last ten or twelve varieties. The soil on which the mangels were sown was a sandy loam, manured in 1899 and summer-fallowed last year.

Two sowings were made of each variety, the first on May 16, and the second on May 30, and the roots from both were pulled on September 24. The seed was sown in drills thirty inches apart, and the yield has been calculated from the weight of roots gathered from two rows each 66 feet long.

With four exceptions, the early sown plots gave the largest returns.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Half Long Sugar White	46	400	1,540	..	38	560	1,276	..
Mammoth Long Red	37	1,768	1,262	48	29	80	968	..
Selected Mammoth Long Red	37	1,240	1,254	..	26	272	871	12
Giant Yellow Globe	36	1,920	1,232	..	32	1,472	1,091	12
Norbiton Giant	35	488	1,174	48	20	128	668	48
Yellow Intermediate	34	1,168	1,152	48	13	1,720	462	..
Giant Yellow Intermediate	34	640	1,144	..	13	928	448	48
Half Long Sugar Rosy	32	680	1,078	..	24	1,368	822	48
Prize Mammoth Long Red	31	1,360	1,056	..	24	576	809	36
Triumph Yellow Globe	29	1,400	990	..	26	8	866	48
Gate Post	29	1,136	985	36	28	1,552	959	12
Mammoth Oval Shaped	28	760	946	..	19	1,600	660	..
Warden Orange Globe	28	232	937	12	17	1,904	598	24
Ward's Large Oval Shaped	27	384	906	24	22	88	734	48
Leviathan Long Red	26	800	880	..	21	240	704	..
Mammoth Yellow Intermediate	25	160	836	..	13	400	440	..
Gate Post Yellow	24	1,896	831	36	33	1,848	1,130	48
Lion Yellow Intermediate	24	1,104	818	24	20	920	682	..
Canadian Giant	21	504	708	24	34	640	1,144	..
Giant Yellow Half Long	21	240	704	..	18	960	616	..
Yellow Fleshed Tankard	19	1,600	660	..	19	1,864	664	24
Champion Yellow Globe	18	1,488	624	48	15	360	506	..
Golden Fleshed Tankard	18	432	607	12	25	1,480	858	..
Sutton's Yellow Globe	15	1,680	528	..	32	1,208	1,086	48
Red Fleshed Tankard	12	24	400	24	11	440	374	..

EXPERIMENTS WITH CARROTS.

The yield of carrots was a very irregular one, a few of the varieties giving large returns while others were scarcely an average crop.

The soil on which these roots were sown was a rich loam, summer-fallowed the previous year. The estimate of yield has been made from the roots produced on two rows each 66 feet long.

Nineteen varieties were tried. The first sowing was made on May 16, and the second on May 30. The seed was sown in drills eighteen inches apart, and all were pulled on October 12.

CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant White Vosges	21	240	704	..	12	1,080	418	..
Half Long White	20	480	674	40	15	800	513	20
Ontario Champion	20	480	674	40	13	840	447	20
White Belgian	19	1,600	660	..	13	1,720	462	..
New White Intermediate	19	1,600	660	..	12	640	410	40
Yellow Intermediate	17	1,640	594	..	11	880	381	20
Scarlet Intermediate	16	1,000	550	..	8	720	278	40
Long Yellow Stump Rooted	14	1,920	498	40	14	600	476	40
Iverson's Champion	14	1,920	498	40	14	600	476	40
Mamm. White Intermediate	11	880	381	20	17	1,200	586	40
Scarlet Nantes	10	1,560	359	20	7	960	249	20
Long Orange or Surrey	9	40	300	40	8	720	278	40
Long Scarlet Altringham	8	1,600	293	20	7	80	234	40
Carter's Orange Giant	7	1,400	256	40	14	1,920	498	40
Green Top White Orthe	6	760	212	40	16	1,880	564	40
Half Long Chantenay	6	320	205	20	13	1,720	462	..
Guerande or Ox-heart	5	1,880	198	..	16	1,000	550	..
Early Gem	4	1,240	154	..	13	840	447	20
White Vosges Large Short	......	......	......	......	14	1,480	491	20

EXPERIMENTS WITH SUGAR BEETS.

Seven varieties of Sugar Beets were tested. The soil was a sandy loam, manured in 1899, and summer-fallowed last year. The first plots were sown on May 16, and the second on May 30, and all were pulled on September 24. The yield per acre has been calculated from two rows each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Red Top Sugar	30	984	1016	24	29	1,136	985	36
Danish Red Top	29	344	972	24	28	232	937	12
Danish Improved	27	1,704	928	24	28	496	941	36
Wanzleben	25	160	836	..	22	1,672	761	12
Vilmorin's Improved	20	1,184	686	24	18	1,752	629	12
Royal Giant	18	960	616	..	18	696	611	36
Improved Imperial	18	960	616	..	26	1,856	897	36

EXPERIMENTS WITH POTATOES.

The season has been an exceptionally favourable one for potatoes. The abundant rainfall in late summer and the open fall encouraged rank growth of both vine and tuber.

The quality of the product was also above the average, many of the varieties being so dry that it was found difficult to boil them.

Formerly when small two-eye sets were used, some difficulty has been experienced from uneven germination, many sets failing to grow. For the past two years large sets have been used with excellent results, the germination being almost perfect.

The average yield of twelve of the most productive varieties covering a period of five years is also given.

The previous crop was pease. There was no injury from rot, and practically all were marketable.

The yield per acre has been estimated in each case from the product of one row 66 feet long.

All the varieties were planted on May 18, in rich clay loam, without manure, and were dug on October 5.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	When Matured.	Average Size.	Quality.	Total Yield per Acre.		Form and Colour.
					Bush.	Lbs.	
Hale's Champion	Fair	Sept. 1	Medium	Fair	737	..	Roundish, oval, white.
I. X. L.	Rank	Not ripe	〃	Good	623	20	Long, round, light pink.
Sabean's Elephant	〃	〃	Small	Poor	619	40	〃 round, white.
Columbus	〃	〃	Medium	Fair	616	..	〃 oval, deep pink.
Daisy	〃	Sept. 1	〃	〃	597	40	〃 〃 light pink.
State of Maine	〃	Not ripe	〃	〃	597	40	Flattish oval, white.
Prolific Rose	〃	Sept. 1	Small	Good	590	20	Roundish, oval, deep pink.
American Wonder	〃	Not ripe	Medium	Fair	586	40	Long, round, white.
Brown's Rot Proof	〃	〃	〃	〃	575	40	Round, oval, deep pink.
Reeve's Rose	〃	〃	〃	〃	575	40	Flat oval, light pink.
Burnaby Seedling	〃	〃	〃	Good	561	..	〃 〃
White Beauty	〃	Sept. 1	〃	〃	553	40	〃 white.
Early Pride	〃	〃 1	〃	Fair	550	..	〃 light pink.
Brownell's Winner	〃	Not ripe	〃	〃	546	20	Irregular deep pink.
Enormous	〃	〃	Small	Poor	542	40	Roundish white.
Vigorosa	〃	Sept. 1	Medium	Fair	539	..	Long, round light pink.
Extra Early Harvest	〃	Not ripe	〃	Good	539	..	Roundish, white.
Carman No. 1	〃	〃	〃	Poor	539	..	Flat, white.
Rose No. 9	〃	〃	Small	〃	531	40	Long, flat, deep pink.
Bill Nye	〃	Sept. 1	Medium	〃	520	40	Roundish oval, white.
Money Maker	〃	〃 1	〃	Fair	520	40	Round, oval white.
Wonder of the World	〃	〃 1	〃	Good	517	..	〃 oval, light pink.
Lizzie's Pride	〃	Not ripe	〃	Poor	517	..	Irregular white.
Quaker City	Fair	〃	〃	〃	513	20	Long, flat, white.
Maule's Thoroughbred	Rank	〃	〃	Good	513	20	〃 oval, deep pink.
Vanier	〃	〃	Small	〃	509	40	Roundish oval, deep pink.
Dreer's Standard	〃	〃	Medium	〃	509	40	Flattish oval, white.
Northern Spy	〃	〃	〃	Fair	506	..	Long, flat, deep pink.
American Beauty	〃	〃	Large	Good	506	..	〃 white.
Seedling No. 7	〃	〃	〃	Fair	506	..	Long, oval, deep red.
American Giant	〃	Sept. 1	〃	〃	502	20	Roundish oval, white.
Clarke's No. 1	〃	Not ripe	Medium	Poor	498	40	Long, flat, light pink.
Good News	〃	〃	〃	Good	498	40	〃 round, deep pink.
Early Norther	〃	Sept. 1	〃	〃	498	40	〃 flat, pink.
Pearce's Extra Early	〃	Not ripe	〃	〃	495	..	〃 〃 deep pink.
Country Gentleman	〃	Sept. 1	Large	〃	491	20	〃 deep pink.
Uncle Sam	〃	Not ripe	Medium	Poor	487	40	Flattish, oval white.
Empire State	〃	〃	Large	Good	484	..	Long, round, white.
Maggie Murphy	〃	〃	Medium	〃	484	..	Flattish, oval, light pink.
Swiss Snowflake	Fair	〃	〃	〃	480	20	Irregular, white.
Early Puritan	Rank	〃	〃	〃	480	20	Long, round, white.
Late Puritan	〃	〃	Small	Fair	476	40	Long, round, white.
Irish Cobbler	Weak	Sept. 1	Large	Poor	476	40	Flattish, white.
General Gordon	Rank	Not ripe	Medium	〃	476	40	Long, round, deep pink.
Rural Blush	〃	〃	〃	Good	473	..	Round, oval, deep pink.
Cambridge Russet	〃	Sept. 1	Small	〃	473	..	Long, round, deep russet.
Canadian Beauty	〃	Not ripe	Medium	Fair	473	..	〃 〃 light pink.
Clay Rose	〃	〃	〃	Good	469	20	Flat, oval, deep pink.
New Queen	〃	Sept. 1	〃	〃	469	20	Long, round, light pink.

POTATOES—TEST OF VARIETIES.

Name of Variety.	Character of Growth.	When Matured.	Average Size.	Quality.	Total Yield per Acre. Bush.	Lbs.	Form and Colour.
Chas. Downing	Rank	Sept. 1	Small	Good	465	40	Flattish oval, white.
Seedling No. 230	"	Not ripe	Medium	Fair	465	40	Roundish oval, white.
Houlton Rose	"	Sept. 1	Large	Good	465	40	Long, round, white.
Great Divide	"	Not ripe	Medium	"	462	..	Irregular, white.
Everett	"	"	"	"	462	..	Long, oval, deep pink.
World's Fair	"	Sept. 1	Small	"	462	..	Flattish white.
Bovee	"	" 1	Medium	Fair	462	..	Long, oval, light pink.
Penn Manor	"	" 1	"	Good	462	..	" deep pink.
Early White Prize	"	" 1	"	"	458	20	Round, oval, light pink.
Harbinger	"	" 1	"	"	454	40	Roundish oval "
Early Rose	"	" 1	"	"	440	..	" "
Stourbridge Glory	"	Not ripe	"	Fair	440	..	Oval, white russet.
Pearce's Prize Winner	"	Sept. 1	Small	Good	432	40	Flattish oval, white.
Delaware	"	" 1	Medium	Fair	425	20	Long, oval, white.
Beauty of Hebron	"	" 1	"	Good	425	20	" round, light pink.
20th Century	"	" 1	Large	Fair	425	20	" " deep russet.
Dakota Red	"	Not ripe	Medium	"	425	20	" flat, deep pink.
Early St. George	"	"	Large	Good	421	40	" oval, deep pink.
Pride of the Market	"	"	Medium	"	421	40	Roundish oval, white.
Chicago Market	"	Sept. 1	"	Fair	421	40	Long, round, white.
Rawdon Rose	"	" 1	"	Good	418	..	Roundish oval, light pink.
Carman No. 3	"	" 1	"	"	418	..	Long, round, white.
Lightning Express	"	" 1	"	"	418	..	Flattish, light pink.
Algoma	"	" 1	"	"	414	20	" oval, deep pink.
Lee's Favorite	"	" 1	Small	"	414	20	Long, oval, light pink.
New Variety No. 1	Fair	Not ripe	Large	"	414	20	Irregular, white.
Irish Daisy	Rank	Sept. 1	Medium	"	414	20	Long, oval, white.
Green Mountain	Fair	Not ripe	"	"	414	20	Flattish oval, white.
Holborn Abundance	Rank	"	Small	"	414	20	Round, white.
Early Michigan	"	Sept. 1	Medium	"	410	40	Long, flat, white.
Reading Giant	"	" 1	Small	"	403	20	Roundish oval, deep pink.
Thorburn	Fair	" 1	Medium	"	403	20	" light pink.
Early Market	Rank	" 1	"	"	399	40	Round, oval.
Sir Walter Raleigh	"	Not ripe	Small	"	396	..	Flattish oval, white.
Russell Seedling	"	"	"	"	392	20	" "
Early Six Weeks	Fair	Sept. 1	Medium	"	392	20	Round, light pink.
Vick's Extra Early	Rank	" 1	Small	"	388	40	Flat, pink.
Flemish Beauty	"	Not ripe	Medium	"	388	40	Oval, deep pink.
Troy Seedling	"	"	Small	"	381	20	Irregular, white.
Seneca Beauty	"	"	Medium	"	381	20	Round, deep pink.
Burpee's Extra Early	"	Sept. 1	Small	Fair	377	40	Roundish oval, light pink.
Record	"	Not ripe	"	Good	377	40	Long, round, white.
McIntyre	Fair	"	"	Poor	377	40	" "
Prize Taker	Rank	Sept. 1	"	Fair	374	..	Roundish oval, deep pink.
Honeoye Rose	"	" 1	Large	Poor	366	40	" light pink.
Rochester Rose	Fair	" 1	Small	Good	352	..	Long, round, light pink.
Rural No. 2	Rank	" 1	Large	"	352	..	Flattish oval, white.
Polaris	"	" 1	"	"	344	40	Long oval, deep pink.
Early Fortune	Weak	" 1	Medium	"	344	40	Roundish, oval, deep pink.
Livingstone	Fair	Not ripe	"	"	344	40	" white.
Seattle	Rank	Sept. 1	Large	"	337	20	Long, flat, light pink.
Early Ohio	Weak	" 1	Medium	"	333	40	Round, oval, light pink.
Fill Basket	"	Not ripe	"	"	330	..	" deep pink.
Early Sunrise	"	Sept. 1	Large	"	326	30	Long, oval, light pink.
Sharpe's Seedling	Fair	" 1	Medium	"	311	40	" "
Ohio Junior	Weak	" 1	"	"	311	40	Roundish oval, light pink.
Earliest of All	Rank	" 1	Large	Fair	308	..	Long oval, light pink.
Up to Date	Weak	Not ripe	Small	"	212	40	Flattish round, white.
Early Andes	"	Sept. 1	Medium	Good	209	..	Roundish oval, white.

AVERAGE Results of a Five Years' Test of Twelve Varieties of Potatoes.

Variety.	Years included.	Average Yield per Acre.	
		Bush.	Lbs.
Seedling No. 7	1897-98-99-1900-1901	402	36
Delaware	1897-98-99-1900-1901	393	4
Carman No. 1	1897-98-99-1900-1901	390	8
Clarke's No. 1	1897-98-99-1900-1901	382	48
Money Maker	1897-98-99-1900-1901	368	8
Lizzie's Pride	1897-98-99-1900-1901	365	12
New Variety No. 1	1897-98-99-1900-1901	365	12
Brownell's Winner	1897-98-99-1900-1901	352	44
Dakota Red	1897-98-99-1900-1901	344	40
Troy Seedling	1897-98-99-1900-1901	340	16
Seedling No. 230	1897-98-99-1900-1901	327	4
Carman No. 3	1897-98-99-1900-1901	321	56

GRASSES.

The season has been a very favourable one for all varieties of grass, the area devoted to this crop has been largely increased on the farm, but most of the plots and fields have been seeded some time and the yields for that reason are not very heavy. All were sown in June without a nurse crop.

Variety.	Area.	When Sown.	Yield per Acre.	
	Acres.		Tons.	Lbs.
Brome Grass	$3\frac{3}{4}$	1898	2	1,658
"	$\frac{1}{10}$	1899	2	1,200
Timothy	$\frac{1}{10}$	1899	1	200
Western Rye Grass	10	1900	3	....

CLOVERS.

When sown with a nurse crop of grain even the hardier varieties of clover only produce in this country small weak plants, which are almost invariably winter killed, but if sown alone, either on ploughed stubble or summer-fallow, and the weeds kept mowed during the summer, the plants become sufficiently strong to withstand the winter, and give a fair return the following summer.

Perhaps the best clover for general cultivation in the western portion of the province is Alfalfa or Lucerne. This should be sown on land free of grass or perennial weeds, in the proportion of thirty pounds of seed per acre. The mower should be run over the land several times during the first year to destroy all annual weeds before they go to seed and the perennial weeds should be hoed or pulled out. The young clover plants are very weak during the first year and must have every opportunity of growing.

The greatest obstacle to clover growing on this farm is the ground or pocket squirrel. This small animal is very fond of clover roots, and if not caught, soon destroys a large proportion of the plants. As they seldom appear above the surface, their run-ways require to be opened ; a spring trap set below the surface of the ground and covered with a board to exclude the light ; by this plan they are generally caught in a short time.

Mammoth Red, Common Red and Alsike were grown during the past year for ploughing under, but only Alfalfa or Lucerne was grown for hay. A one-twentieth acre of this variety yielded in the proportion of 1 ton 300 pounds of dry hay per acre in one cutting. It is usual to make two cuttings each year of Alfalfa, but the first cutting was delayed so long owing to the wet weather that there was not time for a second cutting to grow. Alfalfa should be cut on the first appearance of blossom. If the cutting is delayed after this date the plants become woody and the second cutting is greatly lessened.

MILLETS.

Eight varieties of millet were sown on May 31, in plots of 1-20 acre, but not enough of the seed germinated to make a stand of plants, and the experiment was of no value. On June 8, a second sowing was made of Japanese and Common Millet, the only varieties of which we had seed. As rains were frequent at this time the germination was rapid and a very fair crop was harvested.

The size of the plots was 1-10 acre, the soil a rich clay loam, which had been summer-fallowed.

Both varieties were sown with an ordinary grain drill, 6 inches apart.

Variety.	When Sown.	When Cut.	Yield per Acre.	
			Bush.	Lbs.
Japanese	June 8	Sept. 10	3	1,400
Common	June 8	Sept. 10	2	1,760

SUNFLOWERS.

A 1-40 acre plot of Mammoth Russian Sunflowers was sown on May 31, and cut on October 10. The height was seven feet, and the yield 1 ton 1,000 pounds of heads per acre. The soil was a clay loam summer-fallowed.

CATTLE.

The herd of cattle on the Brandon farm now consists of the following animals :—

Name of Animal.	Breed.	Age.	Weight.
			Lbs.
Lord Lossie	Shorthorn	4 years	2,220
Violet	"	4 "	1,185
Mary of Brandon.	"	2 "	930
Esther	"	4 "	1,295
Prairie Buttercup	"	19 months	790
Eva	"	17 "	730
Sheba of Brandon	"	7 "	470
Roxy of Brandon	"	4 "	290
Prince Charlie	Ayrshire	18 "	980
Primrose	"	3 years	1,195
Bonnie Doon	"	22 months	880
Hugh John	"	22 "	1,090
Siepkje of Brandon	Holstein	3 years	1,290
Richard Lyons	Guernsey	4 "	1,925
Lady Jane Grey	Grade	13 "	1,260
Pansy	"	7 "	1,297
Rose	"	14 months	795
Reddy (steer)	"	3 years	1,310
Dick "	"	2 "	1,200
Pearl	"	6 months	400

Milking Cows.

The accompanying table gives the length of the milking period and the weight of milk given, by a number of the Experimental Farm cows for the past few years.

Name of Cow.	Age.	Breed.	Milking Period.	Pounds Milk.
	Yrs.			
Violet	4	Shorthorn	291 days ending April 21, 1900	2,834
"	5	"	277 " Mar. 16, 1901	3,331
Esther of Smithfield 3rd	4	"	350 " Mar. 16, 1901	4,837
Princess Lida 2nd	6	Holstein	313 " May 24, 1895	8,483
"	8	"	531 " Nov. 17, 1897	7,517
Lida of Brandon	3	"	341 " Dec. 11, 1897	7,336
"	5	"	387 " Feb. 28. 1899	8,261
Siepkje 3rd Queen	11	"	261 " Jan. 5, 1899	7,170
Lida's, Princess of Brandon	4	"	301 " Jan. 9, 1900	6,054
" "	5	.	332 " June 15, 1901	4,967
Dandy	7	Ayrshire	442 " Mar. 14, 1896	9,167
Pansy	3	Ayrshire Grade	314 " Aug. 14, 1897	5,124
"	4	"	373 " Oct. 7, 1898	5,245
"	6	"	358 " April 22, 1900	8,252
Violet	5	Shorthorn Grade	155 " Feb. 17, 1900	1,085
"	6	"	277 " Mar. 16, 1901	3,331
Lady Jane Grey	9	Grade	311 " Feb. 23, 1897	6,815
"	10	"	306 " Mar. 19, 1898	7,492
"		"	348 " May 2, 1899	8,094
"		"	179 " Dec. 7, 1899	5,705
"		"	305 " Feb. 21, 1901	7,416

EXPERIMENTS IN FEEDING STEERS.

DEHORNING AND ITS EFFECT ON CATTLE.

This experiment was a continuation of a similar one made last year, particulars of which can be found on page 363 of last year's annual report.

The steers were apparently all three years old, Shorthorn and Hereford grades, very uniform in quality and size.

The dehorning was done with a sharp carpenter's saw, as described in last year's report, and the operation was a success with all but one of the animals. This steer having a deformed horn, the cutting had to be done very close to the head, causing a profuse bleeding. This stopped in an hour or two, but broke out again during the night, and the animal was found dead in the morning. While it is thought to be an advantage to cut the horns moderately close to the head, it is, apparently, possible to cut too close. Cutting done on a level with the roots of the hair surrounding the horn has given us good results here.

Owing to the above accident, only four steers were used in each group, instead of five, as in last year's test. Two of the groups were dehorned, and one was not dehorned.

One of the dehorned groups was fed in a stall, loose, while the other was tied up alongside of the group with the horns.

The eight animals were tied in double stalls with chains ; the four united animals were confined in a stall, 10 feet by 28 feet, and were fed in a trough running the length of the stall.

When purchased, in November, 1900, the steers cost \$3.25 per hundred pounds, and they sold on April 20, 1901, for \$4.60 per hundred pounds.

This experiment, like the one conducted last year, would lead us to the conclusion that dehorning has very little effect on the fattening of the animals.

RATION FED.

During the first four weeks, Nov. 30 to Dec. 28, 1900, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	7
Bran	5

During second four weeks, Dec. 28 to Jan. 25, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	7

During third four weeks, Jan. 25 to Feb. 22, 1901, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	9

During fourth four weeks, Feb. 22 to March 22, 1901, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	11

During fifth four weeks, March 22 to April 19, 1901, each steer received per day :

	Lbs.
Straw	10
Ensilage	23
Chop	11

DESCRIPTION OF FODDER.

The straw was a mixture of wheat and oats. The fodder corn was made from early ripening varieties, well cured in stooks outside, and only drawn in as wanted. The chop consisted of one-third each of wheat screenings, oats and barley, and the ensilage was made from early ripening varieties of corn.

COMPARATIVE GAINS.

Horned and Tied Up.	Date.	Weight.	Gain.	Total Gain.
Original weight	Nov. 30	4,645 lbs.		
Weight end of 1st period	Dec. 28	4,875 "	230 lbs.	
" 2nd "	Jan. 25	4,995 "	120 "	
" 3rd "	Feb. 22	5,160 "	165 "	
" 4th "	Mar. 22	5,420 "	260 "	
" 5th "	April 18	5,497 "	77 "	852 lbs.

COMPARATIVE GAINS—*Concluded.*

Dehorned—Tied.	Date.	Weight.	Gain.	Total Gain.
Original weight	Nov. 30	4,650 lbs		
Weight end of 1st period	Dec. 28	4,796 "	146 lbs.	
" 2nd "	Jan. 25	4,889 "	93 "	
" 3rd "	Feb. 22	4,980 "	91 "	
" 4th "	Mar. 22	5,215 "	235 "	
" 5th "	April 18	5,290 "	75 "	640 lbs.

Dehorned—Loose.	Date.	Weight.	Gain.	Total Gain.
Original weight	Nov. 30	4,595 lbs		
Weight end of 1st period	Dec. 28	4,801 "	206 lbs.	
" 2nd "	Jan. 25	4,975 "	174 "	
" 3rd "	Feb. 22	5,075 "	100 "	
" 4th "	Mar. 22	5,367 "	292 "	
" 5th "	April 18	5,447 "	80 "	852 lbs.

COST OF FEEDING EACH LOT OF FOUR STEERS.

5,600 pounds of straw at $1 per ton	$ 2 80
2,240 pounds of corn fodder at $4 per ton	4 48
11,536 pounds of ensilage at $2 per ton	11 53
5,040 pounds of chop at 75 cents per hundred	37 80
560 pounds of bran at $10 per ton	2 80
	$59 41

SUMMARY OF RESULTS.

—	First Cost of Steers.	Value of Feed Consumed.	Price Sold for.	Profit.
Horned	$150 96	$59 41	$252 86	$42 49
Dehorned—tied	151 12	59 41	243 34	32 81
" loose	149 33	59 41	250 56	41 82

SPELTZ AS FEED FOR STEERS.

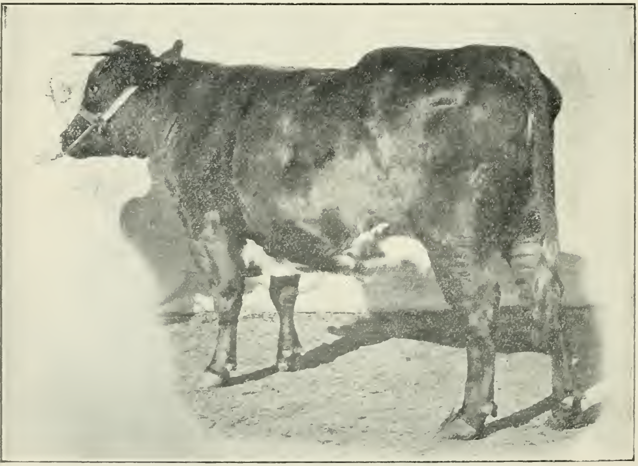
As stabling is somewhat limited on the Experimental Farm, only four steers could be used in this experiment. All were three-year-old Shorthorn grades, uniform in size and quality.

They were purchased in November, 1900, for $3.25 per hundred pounds, live weight, and were sold in April for $4.60 per hundred pounds.

All were tied in double stalls and fed a similar ration except that one group received chop composed of one-third oats, one-third wheat screenings and one-third barley, and the other group received an equal quantity of chopped Speltz, which was ground with the chaff on.

It will be noticed that the steers fed on Speltz made a somewhat larger profit than those fed on mixed grain.

Ayrshire Grade Cow Pansy.



Shorthorn Grade Cow Violet.

COMPARATIVE GAINS.

Steers Fed on Speltz.	Date.	Weight.	Gain.	Total Gain.
Original weight	Dec. 28	2,502 lbs.		
Weight end of 1st period	Jan. 25	2,582 "	80 lbs.	
" 2nd "	Feb. 22	2,632 "	50 "	
" 3rd "	Mar. 22	2,765 "	133 "	
" 4th "	April 18	2,810 "	45 "	308 lbs.

Steers Fed on Mixed Grain.	Date.	Weight.	Gain.	Total Gain.
Original weight	Dec. 28	2,497 lbs.		
Weight end of 1st period	Jan. 25	2,542 "	45 lbs.	
" 2nd "	Feb. 22	2,560 "	18 "	
" 3rd "	Mar. 22	2,675 "	115 "	
" 4th "	April 18	2,725 "	50 "	228 lbs.

COST OF FEEDING EACH LOT OF TWO STEERS.

2,240 pounds of straw at $1 per ton	$ 1 12
840 pounds of corn fodder at $4 per ton	1 68
4,648 pounds of ensilage at $2 per ton	4 65
2,128 pounds of chop at 75 cents per hundred	15 96
	$23 41

SUMMARY OF RESULTS.

—	First Cost of Steers.	Value of Feed Consumed.	Price Sold for.	Profit.
Steers fed on speltz	$81 31	$23 41	$129 26	$24 54
Steers fed on mixed grain	81 12	23 41	125 35	20 82

SPELTZ AS FEED FOR STEERS.

During first four weeks, Dec. 28 to Jan. 25, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	7

During second four weeks, Jan. 25 to Feb. 22, 1901, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	9

During third four weeks, Feb. 22 to March 22, 1901, each steer received per day :

	Lbs.
Straw	10
Corn fodder	5
Ensilage	20
Chop	11

During the fourth four weeks, March 22 to April 19, 1901, each steer received per day :

	Lbs.
Straw	10
Ensilage	23
Chop	11

Brome Grass Pasture for Steers.

The field selected for this purpose was seeded to brome grass, on summer-fallow, in August, 1898. The area was one acre. Four pigs were pastured on it during 1899 and 1900, and any grass they did not consume was cut and made into hay.

One of the animals was a Shorthorn grade, twenty-three months old, and weighing 1,090 pounds on May 8, when the experiment was commenced, the other was a Guernsey grade twenty-one months old, and weighing 980 pounds.

Both steers were kept closely confined to the field from May 8 to August 28. A small building afforded them shelter during severe storms.

Water was given them twice a day, but no grain or other feed in addition to the pasture. There was abundant pasture for the steers until August 28, when it became very short and the cattle were removed.

The accompanying tables give particulars of this experiment.

Comparative Gains.

Shorthorn—Grade Steer 'Reddy.'	Date.	Weight.	Gain.	Total Gain.
		Lbs.	Lbs.	Lbs.
Original weight	May 8	1,090	....	
Weight end of 1st four weeks	June 5	1,215	125	
" 2nd "	July 3	1,250	35	
" 3rd "	" 31	1,300	50	
" 4th "	Aug. 28	1,335	35	245
Guernsey—Grade Steer 'Dick.'				
Original weight	May 8	980	....	
Weight end of 1st four weeks	June 5	1,080	100	
" 2nd "	July 3	1,130	50	
" 3rd "	" 31	1,190	60	
" 4th "	Aug. 28	1,225	35	245

Total gain for the two steers on one acre of brome grass pasture for four months equals 490 pounds, at 3½ cents per pound, equals $17.15.

BULL SERVICE.

The bulls on the Experimental Farm have all been available for service to the farmers and others at a nominal figure. This privilege has been readily taken advan-

tage of, with the result that the stock in this neighbourhood has greatly improved in character since the establishment of the Experimental Farm.

During the past two years, the three bulls on the farm have served 193 cows. This is in addition to the Experimental Farm herd. Eighty-two cows were served by the Shorthorn, 72 by the Guernsey, and 39 by the Ayrshire.

Importance of the Sire.

A very striking instance of the prepotency of the sire is shown in the form and milking record of the two grade cows 'Violet' and 'Pansy.' These were both from the same grade cow, 'Daisy.' Violet's sire was a beefy Shorthorn bull, and Pansy's a large Ayrshire bull. Both take after their respective sires in appearance. The plate near the beginning of this report was made from photographs of these animals. From the accompanying table, it will be seen that the Ayrshire-grade, not only gave the largest quantity of milk per day, but her milking period was also much longer.

Name of Cow.	Breed.	Milking Period.	Pounds Milk.	Number Days.	Milk per Day.	
					Lbs.	Oz.
Violet........	Shorthorn—Grade	Aug. 10, 1899 to Feb 17, 1900.	1,076	191	5	10
Pansy..........	Ayrshire—Grade..	Sept. 29, 1897 to Oct. 7, 1898.	5,241	373	14	..
Violet..........	Shorthorn—Grade	Aug. 15, 1900 to Jan. 17, 1901	1,085	155	7	..
Pansy..........	Ayrshire—Grade..	Apl. 29, 1899 to Apl. 22, 1900	8,252	358	23	..

SWINE.

The herd of swine on the farm continues in good health, and consists of the following animals :—

Name.	Breed.	Age.
Royal Victor..........	Berkshire	3 years.
Neepawa Bob..........	"	10 months.
Minnie Merle 3rd..........	"	2 years.
Three pigs..........	"	3 months.
Amy's Choice 2nd..........	Tamworth..........	3 years.
Nina of Brandon..........	"	3 "
Brandon Princess	Improved Yorkshire	8 months.
Brandon Chief	" "	7 "
Four Cross-breds..........	Berkshire Sow x Tamworth Boar	

POULTRY.

The fowls have kept quite healthy, and seventy chicks were raised during the year. The flock now consists of 48 Light Brahmas, 13 White Plymouth Rocks and 21 Black Minorcas.

Fattening of Brahmas Compared with Plymouth Rocks.

Four Brahmas and an equal number of White Plymouth Rocks were shut up in slatted pens, each 2 x 3 feet, and fed all they would eat of finely-ground grain, consisting of one-third each of oats, wheat and barley. This was given, in troughs, mixed with skim milk to about the consistency of thin porridge.

In the estimate of cost, the meal has been valued at $1 per hundred pounds.

From the accompanying tables, it will be seen that the Brahmas produced the cheapest meat by one-third of a cent per pound. The Plymouth Rock fowls presented the best appearance, being more plump and shapely than the Brahmas.

LIGHT BRAHMAS.

Weight September 24.		Weight October 8.		Weight October 22.		Gain.		Cost.	Cost Per Pound Live Weight.
Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cents.	Cents.
20	9	25	8	29	11	9	2	34	$3\frac{2}{3}$
				WHITE PLYMOUTH ROCKS.					
18	5	22	12	26	5	8	..	32	4

OATS COMPARED WITH MIXED GRAIN AS A FATTENING RATION.

Eight Light Brahmas were used for this test. They were divided into two lots, nearly equal in weight, and shut up in separate feeding pens. One pen was fed with oats alone, ground fine and mixed with skim milk ; the other pen was fed with grain, consisting of one-third each of oats, wheat and barley.

The accompanying table shows that the pen fed with oats made the greatest gain and at the least expense.

Grain Fed.	Weight November 2.		Weight November 22		Gain.		Cost.	Cost Per Pound Live Weight.
	Lbs.	Oz.	Lbs.	Oz.	Lbs.	Oz.	Cents.	Cents.
Oats..................................	23	11	32	..	8	5	31	$3\frac{7}{10}$
Mixed grain..........................	23	13	31	4	7	7	29	$3\frac{9}{10}$

BEES.

Of the eight colonies of bees placed in the cellar last winter, six wintered safely, and two died from diarrhœa. These two hives were located close to, but not touching, an outside stone wall, and the frames were quite damp and mouldy in the spring. One of the hives lost its queen during the winter or early spring. This fact was first discovered by noticing that the bees failed to gather pollen. A queen was at once procured from the south and introduced by means of the shipping case. The bees adopted her at once, quickly became populous, and this colony was one of the largest producers on the farm.

With one exception, the colonies on the Experimental Farm have been kept for years without intermixture from outside sources, and they are exceedingly tame ; but one colony, supplied with an imported queen this year, is decidedly cross and attacks the attendant on the least provocation. It will be interesting to watch the effect of continued gentle treatment on this colony.

The hives were placed on their summer stand on April 19, and at once worked freely on willow and poplar blossom.

Although a part of the season was too cloudy and wet for the best results, the months of July and August were bright and sunny, and the yield of honey for the season averaged 30 pounds per hive, spring count. The quality of the honey was excep-

tionally good, and found ready sale at from 10 to 15 cents per pound for the extracted article.

The honey of this province is very largely obtained from wild flowers, and seldom varies in quality during the season. Nearly all the surplus is gathered during the months of July and August, the other months yielding only sufficient to keep up breeding.

Seven additional swarms were hived during the summer. Six of these were July swarms and one in August. All these became strong before winter, and the early July swarms were among the most productive colonies of the year.

The first extracting was done on July 22, and the first drones were killed on September 9. It is found advisable to place the summer stands among the shelter of trees and only about 4 inches from the ground. This enables the heavy laden bees to reach their hive readily, and saves considerable loss from the strong winds prevailing here.

Although our winters are usually very long, there is generally very little trouble in wintering bees in this province, providing the cellar is dry and dark and the temperature is kept from 35 to 45 degrees. In the fall, before placing the bees in the cellar, the temperature should be carefully ascertained, and unless below 50 degrees, the bees should not be moved from their summer stand until the cellar has cooled. A high temperature causes uneasiness and much loss.

HORTICULTURE.

GENERAL REMARKS.

Notwithstanding some drawbacks, the past season has certainly been a favourable one from a horticultural standpoint. The condition of the soil in the spring was favourable to early germination, and early sown vegetables, such as onions, lettuce, &c., progressed rapidly, a necessary essential to success in the case of vegetables requiring a long growing season. During May, we experienced a long spell of hot and dry weather, the thermometer registering as high as 95 degrees Fahr. in the shade. On the evening of May 24, the thermometer dropped to 28 Fahr., but the only noticeable damage from this cause was the curling of the leaves of the Native Ash (*Fraxinus pennsylvanica lancelolata*) and the Native Oak (*Quercus macrocarpa*). A continued low temperature from this date culminated in a heavy rainfall on June 3 (·94 of inch), and, with a still falling temperature, we were visited with another heavy rain on the evening of the 5th, which changed during the night to snow, loading the branches of the trees so heavily as to break a considerable number of them, also badly smashing the stems of the taller-growing varieties of herbaceous perennials. The most serious damage in this connection was sustained by the hedges, in many instances the centres being laid open, and pruning had to be exercised judiciously throughout the balance of the season in order to overcome the effects. The morning of June 6 was bright, and the snow rapidly disappeared, but unfortunately the thermometer fell in the evening to 27·5 Fahr., seriously reducing a splendid set of plums and crab apples, and totally destroying corn, cucumbers, beans and squash, together with many of the newly bedded annual flowers.

The remainder of the season was all that could be desired, and the comparatively long, open fall compensated for much of the damage done early in the season, and, as an instance of the wonderful rapidity of growth here, the cucumbers, squash, &c., that were destroyed by frost and resown as late as June 7, produced a large crop early in August, results equal to previous years when sown on May 10.

All tree seeds germinated well, and a feature of the season was the luxuriant growth made by both fruit and forest trees, some specimens of the native maple (*Acer negundo*) showing six feet of new wood.

APPLES, 1901.

TRANSCENDENT CRAB.

The two trees of this variety growing on the farm were covered with blossom, and a fine crop of fruit set. Unfortunately, the frost of June 6 completely destroyed it, and no fruit was harvested. A number of scions were taken from these trees during the autumn, which will be used as grafts on *Pyrus baccata* next spring.

PYRUS BACCATA.

There was a large set of a number of varieties of this crab apple, but the frost previously referred to seriously reduced the quantity, though fortunately, enough specimens remained uninjured to allow of a comparison of varieties.

The greater portion of these wild forms were very small, but the following were superior enough to warrant propagation :—

Pyrus baccata sanguinea.—Colour, rosy red, when ripe ; ripe August 20 ; depth, 1 inch ; flavour, fairly sweet, and not very astringent.

Pyrus baccata lutea.—Colour, a deep yellow ; ripe August 18 ; depth, ⅝ inch ; inch ; flavour acid, but palatable.

Pyrus baccata prunifolia.—Colour, deep green, with slight rosy shade on sunny side ; depth, ⅞ of an inch ; flavour palatable, but dry.

Pyrus baccata yellow.—Colour, light yellow ; ripe August 20 ; depth, ¾ of an inch ; flavour acid, but palatable.

The above varieties would make good preserves, and, as their hardiness is unquestionable, they deserve to be generally grown. It is intended to use those smaller fruiting varieties as stocks as fast as superior scions are available.

The following additional varieties of *Pyrus baccata* were received during the past season and planted in a new orchard on the hillside :—

Variety.	Number Received.	Number Alive Fall 1901.
Pyrus prunifolia A A 3548	4	2
" spectabilis floribunda Schendeckeri	4	4
" " A A 1615	4	4
" malus A A	8	7
" " pendula A A	6	4
" " A A 139–1	4	4
" latulæfolia	4	3
" malus orthocarpa A A 7424	4	4
" prunifolia fructucoccinea	4	4
" baccata oblonga A A	4	4
" prunifolia A A 139–2	12	8
" Sieboldii A A 1850	4	4
" baccata A A 2550	4	3
" " sanguinea A A	4	4
" " latekeeping variety	4	3
" " flava	4	4
" " variety A A	4	4
" " A A	4	3

CROSS-BRED APPLES.

The cross-bred apples commented upon on pages 368, 369 and 370 of last year's report made excellent progress during the past season. Many of the trees are now of a considerable size, and will blossom next year, when interesting results are anticipated. Out of a total of 117 trees which went into the winter of 1900-01, all came through in spring alive to tips, with the following exceptions :—

No. 1, Pyrus baccata x *Wealthy.*—Killed back slightly

No. 2, No 162.—Killed back one-quarter.

No. 3, No. 63.—Killed back one-half.

No. 4, Pyrus baccata x *Red Anis.*—Killed back slightly.

No. 5, Pyrus baccata x *Orange Crab.*—Killed back one-half.

The following additional cross-breds were received during the past season, a portion of which were used to complete the block already commenced, the balance being placed in a new orchard situated on the hillside, north of Superintendent's house. The appended notes show their progress during the summer.

Name.	Number Received.	Number Alive Fall 1901.	Name.	Number Received.	Number Alive Fall 1901.
Carleton	2	2	Hunter	4	4
No. 53	2	2	No. 19	1	1
No. 142	1	1	Pyrus baccata x Krim-		
No. 198	1	Dead.	skoe	2	2
No. 192	2	1	Pyrus baccata x Ball's		
No. 179	3	3	Winter Crab	2	2
Eaton	3	3	Pyrus baccata x Pewaukee	2	2
No. 520	2	2	Seedlings of Progress	50	50
Cavan	1	1	" Novelty	48	46
No. 165	2	2	" Eaton	21	17
No. 167	3	3	" Dean	25	20
No 184	2	2	" Eastman	31	27
No. 183	2	1	" Belmont	24	20
Belmont	4	4	" Pioneer	50	50
No. 196	3	3	" Olive	5	4
No. 175	4	4	" Cavan	8	8
No. (lost)	1	1	" Aurora	67	59
No. 163	1	1	" Charles	32	32
Aurora	1	1	" Prairie Gem	49	36
No. 132	1	1	" Pauline	12	12
Eastman	2	2	" Hunter	6	5
Parker	1	1			

The above table shows a very successful planting. Out of a total of 483 trees planted, most of them very small, 440 went alive into winter quarters, or not quite 9 per cent of a loss. We have now a large stock of these cross-breds on the farm, and in a few years some most interesting results in apple culture may be expected, as, up to the present, they have proven quite hardy.

GRAFTED APPLES.

The following varieties of apples were root-grafted on stocks of *Pyrus baccata* in the spring of 1899, and came through the winter of 1899-1900 in good condition. Excellent growth was made during the past season, and their further progress will be watched with interest :—

Ostrakoff, grafted on Pyrus baccata from Stevenson.
Wealthy " " " "
Apple 27 years old, grafted on Pyrus baccata from Stevenson.
Hibernal " " " "
Anisette " " " "
Repka Malenka " " " "
Anisim " " " "
Standard Apple " " " "
Crab Apple " " " "

PLUMS.

Although the plum crop was not a heavy one on the farm this season, it was in many respects very satisfactory. The trees were covered with blossom in the spring, and an exceptionally heavy crop of fruit set, the greater portion of which, however, was destroyed by the frost on the evening of June 6. Fortunately, not many of the trees were entirely stripped. In many instances, they were closely planted and sheltered each other, and enough fruit escaped the frost to enable us to obtain information in regard to the comparative merits of the various varieties. This partial immunity was particularly opportune by reason of the fact that a large block, containing some hundreds of seedlings, had come into bearing for the first time this season, thus enabling us to obtain an amount of data which might have otherwise been considerably delayed.

This large plantation of seedlings was sent from the Central Experimental Farm, in the spring of 1897, where they had been grown from the seed of fruit ripened at Ottawa. As mentioned in my report for 1897, they consisted of seedlings of Cheney, Hungarian, Yosemite Yellow, Voronesh, Ida, Rollingston, Weaver, De Soto, Van Buren, Wolf, Yosemite Purple, Speer and Americana.

Some of the plums described in the following pages were from a consignment sent from Ottawa in the spring of 1893. These were seedlings of Weaver, De Soto and Cheney, grown from plums which had ripened at the Central Experimental Farm. In the spring of 1897, some of the trees from this earlier consignment of seedlings blossomed for the first time, but owing to a late spring frost, the fruit did not form.

My report for 1898 shows that during that season 11 Weaver seedlings, 1 Cheney seedling and 2 De Soto seedlings fruited, but although frost came later than the average season, the fruit was frozen before fully ripe. Twenty of the same lot of seedlings bore fruit in 1899, when the same unfortunate experience occurred. In 1900 they again blossomed well and set fruit freely, but the crop was destroyed by a late spring frost.

The success this year has been most encouraging, but while hopeful for the future of the plum crop in Manitoba, especially from early ripening sorts, it must be borne in mind that there has been no frost in August this year, which is unusual.

The plums which have ripened on the Brandon Experimental Farm this year have been much superior, both in size and flavour, to the fruit produced on trees of the type *Prunus nigra,* which is the wild plum of Manitoba.

The varieties mentioned as Frankland's seedlings were procured from Mr. Thos. Frankland, of Stonewall, Manitoba.

If these plums continue to fruit well and prove hardy, it is intended to propagate the best of them for further distribution and test.

Following will be found comparative notes on the best varieties which ripened.

Weaver Seedling No. 1.—Ripe September 10 ; colour deep red ; depth 1⅜ inches ; nearly round ; thin skin ; flavour very good.

Weaver Seedling No. 4.—Ripe September 16 ; colour greenish yellow, splashed and dotted with red ; depth 1⅜ inches ; slightly elongated ; thin skin ; flavour very fine—one of the best.

Weaver Seedling No. 5.—Ripe September 20 ; colour deep yellow, dotted with red ; depth 1 inch ; round ; skin fairly thin ; flavour good.

Weaver Seedling No. 6.—Ripe September 16 ; colour deep red ; depth 1⅛ inches ; round ; fairly thin skin ; flavour good.

Cheney Seedling No. 8.—Ripe September 12 ; colour bright yellow, splashed with red ; depth 1¼ inches ; slightly elongated and flattened ; thin skin ; flavour fine.

Weaver Seedling No. 9.—Ripe September 10 ; colour bright yellow, splashed with red ; depth 1¼ inches ; slightly elongated and flattened ; thin skin ; flavour excellent.

Weaver Seedling No. 11.—Ripe September 12 ; colour bright yellow, splashed with red ; depth 1⅛ inches ; slightly elongated ; thick skin ; flavour good.

Weaver Seedling No. 12.—Similar to No. 11 in colour and shape, but of better flavour, and ripened four days later.

Wolf Seedling No. 13.—Ripe September 10 ; colour yellow, heavily splashed with red ; depth 1½ inches ; thin skin ; flavour good.

Weaver Seedling No. 14.—Ripe September 24 ; colour greenish yellow, dotted with red ; depth 1¼ inches ; thin skin ; flavour good ; roundish.

Weaver Seedling No. 16.—Ripe September 16 ; colour deep yellow, slightly splashed with red ; depth 1½ inches ; nearly round ; thin skin ; flavour very good.

Weaver Seedling No. 18.—Ripe September 15 ; colour deep yellow, nearly covered with red splashes ; slightly elongated ; depth 1⅝ inches ; thin skin ; flavour very fine—a first-class variety.

Weaver Seedling No. 20.—Ripe September 16 ; colour deep yellow, splashed with red ; depth 1½ inches ; slightly conical ; thin skin ; flavour very good.

Weaver Seedling No. 21.—Ripe September 18 ; colour deep yellow, slightly dotted with red ; depth 1⅝ inches ; slightly elongated ; thin skin ; flavour very fine—a first-class variety.

Voronesh Seedling No. 22.—Ripe September 10 ; colour yellow, heavily splashed with red ; roundish ; depth 1¼ inches ; skin fairly thin ; flavour very good.

Weaver Seedling No. *23.*—Colour bright yellow, slightly splashed with red ; ripe September 13 ; elongated ; depth 1¼ inches ; thin skin ; flavour very good.

Native Seedling, No. 26.—Ripe August 21 ; colour red ; roundish oval ; depth 1 inch ; thin skin ; fine flavour.

Frankland's Seedling No. 27.—Ripe August 25 ; colour yellow, suffused with red ; roundish oval ; depth 1 inch ; thin skin ; flavour pleasant.

Frankland's Seedling, No. 29.—Ripe August 30 ; colour yellow splashed and dotted with deep red ; depth 1 inch ; elongated ; thick skin ; flavour good.

Cheney Seedling No. 30.—Ripe August 30, colour yellow, dotted with red ; depth 1¼ inches ; roundish ; thick skin ; flavour good.

Voronesh Seedling, No. 31.—Ripe September 12 ; colour yellow, splashed and dotted all over with red ; depth 1 inch ; round ; skin fairly thin ; flavour very good—a fine variety.

Yosemite Seedling No. 32.—Ripe September 20 ; colour bright yellow, splashed with bright red ; round ; depth 1 inch ; skin thin ; flavour good.

Voronesh Seedling, No. 35.—Ripe September 16 ; colour yellow, dotted with red ; round ; depth 1 inch ; thick skin ; flavour very good.

Hungarian Seedling, No. 36.—Ripe September 12 ; colour yellow, heavily splashed with red ; depth 1⅛ inches ; slightly flattened ; thin skin ; flavour very good.

Seedling No. 37.—Ripe September 9 ; colour deep yellow, heavily splashed with red ; nearly round ; depth 1½ inches ; thin skin ; flavour very good.

Seedling No. 39.—Ripe September 19 ; colour deep yellow, heavily splashed with red ; depth 1⅛ inches ; roundish and slightly elongated ; thin skin ; flavour good.

Seedling No. 43.—Ripe September 20 ; colour deep yellow, slightly dotted with red ; depth 1 inch ; round ; thin skin ; flavour good.

Seedling No. 47.—Ripe September 16 ; colour deep yellow, heavily splashed with red ; depth 1 inch ; round ; thick skin ; flavour good.

Seedling No. 48.—Ripe September 15 ; colour deep yellow, heavily splashed with red ; depth 1¼ inches ; elongated and flattened ; thin skin ; flavour good.

Seedling No. 49.—Ripe September 15 ; colour deep yellow, splashed with red ; depth 1 inch ; nearly round ; thick skin ; good flavour.

Seedling No. 52.—Ripe September 16 ; colour deep yellow, dotted with red ; depth $1\frac{3}{8}$ inches ; fairly thin skin ; flavour good.

Seedling No. 55.—Ripe September 16 ; colour deep yellow, slightly dotted with red ; thin skin ; flavour good ; nearly round.

Seedling No. 56.—Ripe September 16 ; depth $1\frac{1}{4}$ inches ; colour bright yellow, slightly dotted with red ; slightly flattened ; thick skin, flavour good.

Seedling No. 57.—Ripe September 16 ; depth 1 inch ; colour deep red ; conical ; thick skin ; flavour good.

Seedling No. 58.—Ripe September 17 ; colour bright yellow, slightly dotted with red ; depth 1 inch ; roundish ; thick skin ; flavour good.

Seedling No. 59.—Ripe September 15 ; colour bright yellow, heavily dotted with red ; depth $1\frac{1}{8}$ inches ; conical ; thin skin ; flavour good.

Seedling No. 60.—Ripe September 17 ; colour yellow, heavily splashed with red ; depth $1\frac{1}{8}$ inches ; thin skin ; flavour good.

Seedling No. 61.—Ripe September 15 ; colour yellow, heavily splashed with red; roundish; thin skin; flavour good.

Seedling No. 63.—Ripe September 16; colour deep yellow, nearly covered with red; depth $1\frac{3}{8}$ inches; conical; fairly thin skin; flavour very good.

Seedling No. 65.—Ripe September 15; colour deep red; depth $1\frac{1}{8}$ inches; conical; thick skin; flavour good.

Seedling No. 66.—Ripe September 18; colour deep yellow, heavily dotted with red; depth 1 inch; conical; thin skin; flavour good.

Seedling No. 67.—Ripe Septemper 17; colour deep yellow, heavily dotted with red ; conical ; depth 1 inch ; think skin ; flavour good.

Seedling No. 71.—Ripe September 20; colour greenish yellow, dotted with red; depth $1\frac{1}{2}$ inches; roundish; thin skin; flavour good—a fine variety.

Seedling No. 74.—Ripe September 28; colour deep red; depth 1 inch; round; thin skin; flavour good.

Seedling No. 75.—Ripe September 20; colour deep yellow, dotted with red; depth 1 inch; roundish; thin skin; flavour very good.

Seedling No. 76.—Ripe September 17 ; colour deep yellow, dotted with red ; depth $1\frac{1}{8}$ inch; roundish; thin skin; flavour very good.

Seedling No. 77.—Ripe September 20; colour bright yellow, dotted with red; depth $1\frac{1}{8}$ inches; slightly conical; thin skin; flavour good.

Seedling No. 80.—Ripe September 20 ; colour deep yellow, heavily splashed with red; depth $1\frac{1}{8}$ inches; flattened and elongated; thin skin; flavour good.

Seedling No. 81.—Ripe September 23; colour deep yellow, heavily splashed and spotted with red; depth $1\frac{1}{4}$ inches; conical; flattened; thin skin; flavour good.

Seedling No. 82.—Ripe September 23; colour yellow nearly covered with red ; depth $1\frac{1}{16}$ inch; thin skin; flavour good; conical.

Seedling No. 83.—Ripe September 18; colour yellow, heavily splashed and dotted with red; depth $1\frac{1}{4}$ inches; elongated; thin skin; flavour very good.

Seedling No. 84.—Ripe September 8; colour bright red; depth, $1\frac{1}{4}$ inches; elongated; flavour good; thin skin.

Seedling No. 86.—Ripe September 10; colour yellow, heavily splashed with red; depth $1\frac{1}{8}$ inches; elongated; thin skin; flavour very good.

Seven fair-sized trees of *Aiken* plum were received during the season from Mr. H. L. Patmore's nurseries, Brandon, and planted on the hillside. These are the only representatives growing on the farm of this variety, which has proven very satisfactory locally, and also at the Experimental Farm at Indian Head.

SAND CHERRIES.

There was a very fair crop of Sand Cherries harvested during the past season, which would have been exceptionally heavy had not the frost of June 6th seriously injured them.

Brandon, No. 6.—Ripe August 4 ; medium size ; dark red in colour, slightly astringent ; very prolific ; thin skin ; firm flesh ; fairly sweet.

Seven trees of 'Rupert' Cherry and one tree of 'Compass' Cherry, crosses between the Sand cherry and plum, were received from the Central Experimental Farm during the past season. All made excellent growth, which ripened well and went into winter quarters in good condition.

RASPBERRIES.

Owing to the unfavourable season of 1900, very little growth was made in raspberries, consequently the crop of 1901 was extremely light. The past year's growth, however, has been very vigorous and gives promise of a satisfactory crop next season. On the approach of winter, the canes were laid down and the tips covered with soil, in order to afford as much protection as possible.

CHERRIES.

A small quantity of seed of three varieties of cherries were received from Russia in the fall of 1900.

These were stratified for the winter and sown on April 25, 1901. The germination was good and a number of plants of each variety made excellent growth, and have gone into winter quarters in fine condition.

CURRANTS.

The currant crop of 1901 was only a very medium one. Although there was a good display of bloom, the setting was considerably interfered with by spring frosts, and only a comparatively small crop of fruit was harvested. Exceptionally fine growth, however, was made during the season, and hopes are entertained of better results in 1902.

Following will be found a few notes on the different varieties under cultivation here, which have fruited during the past season.

RED VARIETIES.

Red Grape.—A robust grower ; flavour fairly sweet ; size medium to large ; length of spike, 1¾ inches ; ripens evenly.

Raby Castle.—A robust grower ; fairly sweet ; size medium to large ; length of spike, 1⅞ inches ; ripens evenly.

Pomona.—A fairly vigorous grower ; size medium to large ; length of spike, 2 inches ; flavour sweet ; an even ripener.

Wilder.—Produced only a very few berries ; trees small.

North Star.—A robust grower ; size small to medium ; flavour fairly sweet ; length of spike, 2 inches ; even ripener.

Red Cherry.—Of weak growth ; a large berry ; sub-acid ; length of spike, 1¼ inches ; not productive.

Versailles.—A fairly vigorous grower ; size small to medium ; length of spike, 1¼ inches ; not fruitful ; very sweet.

Fay's Prolific.—Produced very little fruit ; plant weak ; flavour insipid ; berries very large.

Prince Albert.—A vigorous grower ; fruit small ; sweet ; length of spike, 1¼ inches; not fruitful.

Victoria.—A vigorous grower ; fruit medium ; slightly acid ; length of spike, 1⅞ inches ; ripens evenly ; fairly productive.

Fertile D'Angers.—This variety has spikes of medium length ; size large ; sweet ; a fairly vigorous grower.

WHITE VARIETIES.

White Grape.—Flavour good ; sweet ; length of spike, 1¾ inches ; berry small to medium ; a vigorous grower, but gave a poor crop.

White Dutch.—Vigorous grower ; fruit small to medium ; flavour very pleasant ; spike of medium length, somewhat thinly set.

BLACK VARIETIES.

Black Champion.—Killed to near ground, winter 1900-1901. Made fair growth 1901.

Lee's Prolific.—A robust grower ; thinly set ; flavour poor, sub-acid ; skin tough.

Victoria.—Plants weak and produced practically nothing.

Black Naples.—Plants in weak condition, and produced very little fruit.

Standard.—A vigorous grower ; skin thin ; flesh sweet and juicy ; berries large.

Monarch.—A vigorous grower ; berries of medium size ; skin thin ; spikes very thinly set ; flesh sweet and juicy.

Eclipse.—Skin rather tough, sub-acid ; medium sized berries thinly set ; a fairly vigorous grower.

Charmer.—Berry of medium size ; skin tough ; flavour fair, somewhat acid ; a vigorous grower ; thinly set.

Stewart.—Size medium to large ; skin tough ; of fair flavour, acid ; a vigorous grower ; thinly set.

Perry.—Berry small to medium ; skin tough ; of fair flavour, somewhat acid ; a vigorous grower ; thinly set.

Kerry.—Skin rather tough ; of fair flavour, acid ; a vigorous grower ; not very productive ; spikes thinly set.

Winona.—Berry of medium size ; skin thin ; flesh juicy and sweet ; a vigorous grower ; thinly set.

Clipper.—Berry small to medium ; skin fairly tender ; flesh slightly acid ; a vigorous grower ; fruit thinly set.

Beauty.—Berry medium to large ; thin skin ; flesh sweet and juicy ; fairly well set ; a vigorous grower.

Ontario.—Berry small to medium ; skin moderately thin ; flesh fairly sweet and juicy ; fairly well set ; a vigorous grower.

Eagle.—Berry medium to large ; skin thin ; flesh sweet and juicy ; a very vigorous grower ; thinly set.

RHUBARB.

There are now nineteen varieties of this useful vegetable growing at the Experimental Farm, most of them showing distinct characteristics in colour, habit of growth, yield, &c.

Owing to the comparatively trifling production of fruit in Manitoba and the high prices charged for the imported product, rhubarb occupies a prominent position in the Manitoba housekeeper's supply of preserves. Fortunately, rhubarb seems to be specially adapted to the Manitoba climate, and with even a moderate amount of cultivation will respond freely.

It is always desirable, if possible, to plant in considerable quantity, so that some of the roots may be available for spring forcing. These should be lifted just before freezing up, placed in barrels in the cellar and covered with sand. Water should then be given from time to time as required, and in a short time tender and juicy shoots will be produced, which, coming in mid-winter, are a very desirable addition to the table. The forced roots should be planted outside the following spring, and allowed one year to recuperate before pulling. The following descriptive notes were taken during the growing season, and to secure the weights an average plant of each variety was stripped on June 27.

Early Scarlet.—A fairly vigorous grower ; colour bright cherry red throughout ; deeply ribbed on under side of stalk ; very tender and juicy ; average length of stalk, 18 inches ; weight from one plant, 13 pounds.

Early Prince.—A fairly vigorous grower ; colour green, heavily mottled with light red ; slightly ribbed on under side ; very tender and juicy ; average length of stalk, 22 inches ; weight from one plant, 24 pounds.

Sangster's Prince of Wales.—A very vigorous grower ; colour brilliant red throughout, no green ; stalk slightly indented on upper side and ribbed on under side ; very tender and juicy ; average length of stalk is 22 inches ; weight from one plant, 20 pounds. A very fine variety.

Tobolsk.—A vigorous grower ; colour a mottled red ; slightly ribbed on under side ; deeper colour than No. 2 ; very tender ; upper side nearly flat ; average length of stalk, 22 inches ; weight from one plant, 25 pounds.

Paragon.—A fairly vigorous grower, of a mottled deep red colour ; ribs on under side well defined, and deep indentation on upper side ; only fairly tender ; average length of stalk, 16 inches ; weight from one plant, 10½ pounds.

Prince Albert.—A vigorous grower ; heavily mottled with deep red ; slightly ribbed on under side ; nearly flat on upper side ; very tender and juicy ; average length of stalk, 24 inches ; weight from one plant, 31½ pounds.

Magnum Bonum.—A vigorous grower ; of a light red mottled colour ; slightly ribbed on under side ; nearly flat on upper ; similar in appearance to No. 6, though not so deep in colour ; very tender and juicy ; average length of stalk, 20 inches ; weight from one plant, 27 pounds.

Brabant's Colossal.—A very vigorous grower ; of a light red mottled colour ; nearly smooth on under side ; upper side nearly flat ; tender and juicy ; average length of stalk, 26 inches ; weight from one plant, 30 pounds.

Early Crimson.—An extremely vigorous grower ; lower half stalk mottled with light red, upper half greenish ; heavily ribbed on under side, upper side indented ; tender ; average length of stalk, 26 inches ; average weight from one plant, 30½ pounds.

Scarlet Nonpareil.—A very vigorous grower ; colour mottled with red ; moderately ribbed on under side ; well marked indentations on the upper side ; tender and juicy ; average length of stalk, 26 inches ; average weight from one plant, 26 pounds.

General Taylor.—A moderate and very even grower, with very little variation in size of stalk ; colour green throughout, sparsely mottled with very deep red ; tender and juicy ; heavily ribbed on under side, indented on upper ; average length of stalk, 14 inches ; average weight of one plant, 16½ pounds.

Marshall's Royal Linnæus.—A vigorous grower ; colour mottled with light red ; slightly ribbed on under side, nearly flat on upper side ; very tender ; average length of stalk, 16 inches ; average weight of one plant, 26 pounds.

Giant.—A vigorous grower ; colour heavily mottled with light red ; under side ribbed ; upper side nearly flat ; very tender and juicy ; average length of stalk, 18 inches ; average weight from one plant, 19 pounds.

Excelsior.—Planted fall of 1900 ; not yet advanced enough to report on.

Royal Albert.—A somewhat weak grower ; stalks numerous but thin ; colour at base very bright red, shading to green, mottled with red. Only very slightly ribbed on upper side, tender. Average length of stalk, 14 inches. Average weight from one plant, 22½ pounds.

Queen.—Planted fall 1900, and not sufficiently advanced to report on.

Strawberry.—A very vigorous grower ; colour mottled with light red ; slightly ribbed on under side, nearly flat on upper side. Average length of stalk, 20 inches. Average weight from one plant, 31½ pounds.

Tottle's Improved.—An extremely vigorous grower ; individual stalks very large ; deeply indented on upper side and distinctly ribbed on lower ; somewhat stringy ; colour greenish ; slightly mottled with light red. Average length of stalk, 20 inches ; average weight from one plant, 31½ pounds.

Victoria.—A vigorous grower ; colour lower half deep red, shading to a mottled red towards leaf. Indented on upper side and distinctly ribbed on lower ; tender and juicy. Average length of stalk, 14 inches ; average weight from one plant 17 pounds.

ARBORETUM.

No additions were made to the Arboretum during the past season. A portion of the hillside to the north consisting of a poor gravelly ridge was planted with green ash, which made fair growth, nearly all the trees planted surviving. As the larger part of the Arboretum is now covered with grass, it is rendered more attractive, and the large collection of varieties included is much appreciated by visitors. The growth in some portions has been so luxuriant that a considerable number of trees have had to be removed to make room for the more meritorious varieties which were being crowded. A gratifying feature in connection with this is that many varieties which were classed as tender a few years ago, are now proving much hardier on account of the shelter they enjoy.

ADDITIONS TO ARBORETUM IN 1900.

The following notes on trees added to the Arboretum during 1900 show their condition after one winter's trial.

Scotch Yellow Rose.—Wintered well ; strong growth, 1901.

Populus nigra.—Wintered well ; strong growth, 1901.

Juniperus sabina erecta.—Wintered well ; strong growth, 1901.

Picea excelsa.—Wintered well ; strong growth, 1901.

Lonicera tatarica grandiflora.—Wintered well, strong growth, 1901.

Amber Currant.—Wintered well ; strong growth, 1901.

Rosa acicularis.—Wintered well ; strong growth, 1901.

Carpinus caroliniana.—Wintered well ; strong growth, 1901.

Fraxinus nigra.—Killed back one-half ; weak growth, 1901.

Japanese Oak.—Killed back one-half ; weak growth, 1901.

Rosa alpina.—Wintered well ; strong growth, 1901.

Rhus aromatica.—Killed back three-quarters ; strong growth, 1901.

Thuya occidentalis Elwangeriana.—Wintered well ; strong growth, 1901.

Ribes aureum tenuifolium.—Wintered well ; strong growth, 1901.

Rhamnus davurica.—Killed back one-quarter ; strong growth, 1901.

Rosa cinnamonea sibirica.—Wintered well ; strong growth, 1901.

Thuya occidentalis variegata.—Wintered well ; fair growth, 1901.

Rhamnus catharticus.—Killed back one-half ; strong growth, 1901.

Spiraea sorbifolia.—Killed back one-quarter ; strong growth, 1901.

Ribes alpinum sterile.—Wintered well ; strong growth, 1901.

Betula alba fastigiata.—Wintered well ; fair growth, 1901.

Gymnocladus canadensis.—Wintered well ; strong growth, 1901.

Photinia variabilis.—Dead ; winter killed.

Coloneaster acutifolia.—Wintered well ; strong growth, 1901.

Berberis vulgaris foliis purpureis.—Killed back one-half ; fair growth, 1901.

Acer Saccharinum, No. 1, from Minnesota Seed.—Killed back one quarter ; fair growth, 1901.

Acer saccharinum, No. 2, from Minnesota Seed.—Killed back one-quarter ; fair growth, 1901.

Cytisus nigricans.—Killed back one half ; strong growth and flowered, 1901.

Celastrus articulatus.—Killed back three-quarters ; weak growth, 1901.

Rhus glabra.—Dead ; winter killed.

Salix candida femina.—Wintered well ; strong growth, 1901.

FLOWERING SHRUBS.

There are now a very large number of flowering shrubs growing on the Experimental Farm, many of which are very beautiful, and they elicit much admiration from visitors who are fortunate enough to visit the farm during their flowering period. The following were specially noted during the past season :—

Syringa vulgaris (Common Lilac).—Commenced to flower on May 19. These were exceptionally fine during the past season, as many as two hundred spikes being counted on some bushes. This is one of our most desirable shrubs, and is quite hardy.

Crataegus coccinea.—This beautiful hawthorn, though a native shrub, is well worthy of extensive cultivation. It commenced to flower on May 17, and continued until the end of the month, during which time it was a dazzling mass of white.

Viburnum lantana (Wayfaring tree).—Commenced to flower on May 21. Its pretty white trusses, borne in profusion, make it desirable in a collection of flowering shrubs. Thoroughly hardy.

Lonicera tatarica (Tartarian Honeysuckle).—This beautiful honeysuckle is one of our most desirable flowering shrubs. It commenced to bloom on May 22, and continued in flower for nearly a month, being literally covered with blossoms during that period. It is quite hardy, and succeeds in almost any location.

Caragana Redouski (Siberian Pea).—This variety of caragana is much more floriferous than *Caragana arborescens,* and of a dwarf habit. It is a mass of yellow when in full bloom, and is quite a resort for bees. Commenced to flower on May 18. Thoroughly hardy.

Prunus pumila (Sand Cherry).—A very early blooming and strong growing shrub; commencing to bloom early in May, it furnishes a mass of white flowers which are very acceptable at that season. It is quite hardy.

Caragana frutescens pendula.—This is one of the most beautiful of the caraganas; its charming pendulous habit, coupled with its free blooming propensities, makes it a most desirable acquisition to a collection of ornamental shrubs. It commenced to flower May 18. Quite hardy.

Spiraea hypericifolia.—A dwarf flowering shrub of compact habit, producing large masses of pure white flowers, early in the season. Hardy.

Syringa vulgaris, Charles X.—This is the best variety of Lilac as yet grown at the Farm ; the spikes are very large and full, of a much deeper colour than *Syringa vulgaris,* and it is very free flowering.

Pyrus Americana (*Mountain Ash*).—The western form of this species is quite hardy here, and its large trusses of white flowers in late spring, followed by its brilliant red berries in autumn, combine to make it one of our most beautiful flowering shrubs.

Viburnum opulus sterilis (*Snowball*).—This is the sterile form of the High Bush Cranberry (Viburnum opulus). Its large ball-like trusses of beautiful white flowers, which are borne very abundantly, make it a most desirable ornamental shrub ; quite hardy.

Cytisus purpureus.—This began to flower May 22. A dwarf and very floriferous species. The pea-shaped flowers are of a bright purple colour and are borne in profusion.

Genista tinctoria (*Greenweed*).—A very free flowering dwarf ornamental shrub. Its yellow pea-shaped flowers literally cover the plant and present a dazzling mass of colour ; hardy.

Pyrus malus.—Though not thoroughly hardy, this shrub will produce flowers here and is well worthy of a trial. The blossoms are of a fair size and of a bright brick red colour, making a very attractive specimen.

HEDGES.

The large hedges consisting of Native Spruce (*Picea alba*), Native Maple (*Acer negundo*), Siberian Pea Tree (*Caragana arborescens*), Native Ash (*Fraxinus pennsylvanica lanceolata*), made excellent growth during the season. No additions were made to our sample hedges, a number of which suffered considerably from the effects of the snowstorm, previously referred to, as did also the large Caragana hedge, planted in 1893. By careful pruning, however, nearly all traces of the damage have been obliterated and no permanent injury is anticipated.

Following will be found some notes on these hedges, taken during the season :—

Pyrus baccata aurantiaca (*Berried Crab of Siberia*).—A promising hedge, but somewhat thin.

Lonicera tatarica elegans (*Bush Honeysuckle*).—A very promising medium sized hedge.

Caragana mollis glabra.—Promising but not so compact as *Caragana arborescens.*

Artemisia abrotanum (*English Southernwood*).—A very symmetrical dwarf hedge.

Shepherdia argentea (*Buffalo Berry*).—An ornamental dwarf hedge.

Rosa rugosa.—A low growing hedge, ornamental when in flower but suckers badly.

Celtis occidentalis (*Hackberry*).—Does not promise to be a desirable hedge ; not thoroughly hardy and rather sensitive to spring frosts.

Ligustrum amurense (*Amur Privet*).—Not thoroughly hardy, but a very symmetrical dwarf hedge.

Spiraea Douglasii (*Douglas's Spirea*).—Rather unpromising as a hedge, not thoroughly hardy.

Syringa Josikea (*Hungarian Lilac*).—Very symmetrical and ornamental.

Crataegus Coccinea (*Native Hawthorn*).—A very slow growing and somewhat thin hedge.

Lonicera albertii (*Albert's Honeysuckle*).—An ornamental hedge, but needs trellising to keep it in shape.

Fraxinus pennyslvanica lanceolata (*Native Green Ash*).—Not a promising hedge ; thin and rather susceptible to spring frosts.

Prunus Americana (*Native Plum*).—Promising ; a fairly compact hedge.

Acer ginnala (*Asiatic Maple*).—A most ornamental dwarf hedge ; very compact.

Rhamnus frangula (*Breaking Buckthorn*).—Makes a compact hedge.

Caragana grandiflora (*Large Flowering Pea Tree*).—A good medium hedge ; badly bent down by snowstorm.

Salix Britzensis (*Willow*).—A promising looking hedge.

Thuya occidentalis (*Western Arbor-vitæ*).—Makes a small and slow growing hedge.

Artemisia Abrotanum tobolskianum (*Rusian Southernwood*).—Not a desirable hedge.

Populus deltoidea (*Cottonwood*).—This free growing hedge has died from a severe attack of the yellow poplar rust which causes the leaves to wither and drop.

Larix pendula (*American Larch*).—Gives promise of making a good deciduous hedge.

Salix Laurifolia (*Laurel-leaved Willow*).—One-half killed out.

Salix Voronesh (*Voronesh Willow*).—Not healthy, killed back somewhat.

Rosa rubrifolia (*Red-leaved Rose*).—Killed back one-half ; not a desirable shrub here for hedge purposes.

Cotoneaster vulgaris (*Common Cotoneaster*).—Apparently of rather too spreading a habit to make a satisfactory hedge.

Lonicerea Tatarica elegans (*Elegant Tartarian Honeysuckle*).—Symmetrical and ornamental.

Salix laurifolia (*true*) *True Laurel-leaved Willow*).—Not healthy.

Ribes aureum (*Yellow Flowering Currant*).—A very pretty hedge.

Neillia opulifolia aurea (*Golden-leaved Ninebark*).—A very ornamental dwarf hedge.

Neillia opulifolia (*Ninebark*).—Very handsome and compact.

Populus tremuloides (*Tremulous Poplar or Aspen*).—A somewhat thin hedge.

Prunus pennsylvanica (*Native Pin Cherry*).—A symmetrical and compact hedge.

Corylus americana (*Native Hazel Nut*).—Not a promising hedge.

Amelanchier alnifolia (*Native Saskatoon*).—Ornamental but thin.

Rosa Sayi (*Native Wild Rose*).—An ornamental hedge, but its propensity to sucker makes its value questionable.

Spiraea salicifolia (*Native Meadow Sweet*).—A fine dwarf ornamental hedge,

Symphoricarpus occidentalis (*Native Snow-Berry*).—A very symmetrical hedge, but was badly bent down by snowstorm.

Elæagnus argentea (*Wolf Willow*).—Ornamental but somewhat thin.

Cornus stolonifera (*Native Dogwood*).—A compact and symmetrical hedge.

Syringa vulgaris (*Common Lilac*).—A good ornamental hedge.

AVENUES.

On account of the storm previously referred to, a vigorous pruning was necessitated on the Maple Avenue (*Acer negundo*) during the summer, and at the close of the season very few traces of damage were discernible.

The avenue composed of Native spruce (*Picea alba*) alternated with Native Maple, is a very attractive feature on the Farm. Many of the Spruce trees are now twenty feet high, and a considerable amount of seed was gathered from them during the autumn.

SHRUBS AND TREES RECEIVED DURING 1901.

A considerable number of trees representing one hundred and fourteen varieties were received from the Central Experimental Farm during the past year, and were planted in one of the Hedge Plots. Some of these, including some received from France, succumbed shortly after being planted, being in an advanced condition on arrival. All the varieties were, however, represented in the fall, and as many interesting species are included, it is hoped that they will winter successfully.

Perhaps one of the most interesting portions of the consignment was a collection of twenty distinct varieties of Lilac, which will be a most welcome addition to our stock of this very popular flowering shrub.

THE VEGETABLE GARDEN.

The past season was in most respects a decidedly favourable one for vegetables. The soil was in good condition for germination in the spring, and with the exception of a few weeks of dry weather immediately succeeding this, the season was all that could be desired. Nearly all varieties tested were up to and even above the average, and notwithstanding a sharp frost on the evening of June 6, very little material damage was noticeable. The results were very satisfactory.

ONIONS.

The onion crop was one of the most satisfactory recorded at the farm for some years. Nine varieties were sown on April 10, with Planet Junior hand drill, in rows eighteen inches apart. The seed germinated readily, the growth was vigorous all through the season, and all varieties ripened well. The yield was above the average. There was a very small percentage of 'thick necks,' and no traces of disease were manifest. The 'sets' were quite satisfactory with the exception of 'English Multipliers,' which were not as vigorous as usual. In the following table they are arranged in the order of their productiveness :—

Variety.	Date Sown.	Date Ripe.	Colour.	Shape.	Per cent of Thick Necks.	Average Weight of Bulbs.	Yield per Acre.	
						Ozs.	Bush.	Lbs.
Yellow Globe Danvers.....	April 10	Sept. 3	Light yellow..	Globular..	0	6	556	36
Trebon's Yellow....	" 10	" 7	" ..	" ..	0	5	538	27
White Spanish Straw Coloured	" 10	" 12	Dark yellow..	Flattish ..	15	5½	459	48
Blood Red	" 10	" 6	Dark red.....	" ..	0	6	453	45
White Dutch Hard Round.	" 10	" 6	White........	" ..	9	4¾	423	30
Red Wethersfield....... ...	" 10	" 6	Dark red......	" ..	3	7½	423	30
Market Favorite Keeping..	" 10	" 6	Dark yellow..	Flat......	5	5	405	21
Paris Silver Skin..........	" 10	" 3	White	" ..	2	4½	363	..
James' Keeping........ ..	" 10	" 3	Dark yellow..	Globular..	4	4	326	42
ONION SETS.								
Shallots.........	April 10	July 25	Brown.......	Clusters ..	0	1	170	40
English Multipliers........	" 10	" 20	Dark yellow..	" ..	0	2½	195	33
Yellow Dutch Sets	" 10	" 30	Light yellow..	Globular..	0	8	586	34

LETTUCE.

Nineteen varieties of lettuce were sown on April 10, with Planet Junior hand drill, in rows sixteen inches apart. On account of the moist condition of the soil, the germination was prompt, and all the varieties were well represented. For some time

after germination there was a period of dry, hot weather, which materially affected their progress, and which may account for the fact that a considerable percentage went to seed before forming heads. All varieties ripened seed, which was collected for future use.

The results of the test are given below in the order of their productiveness :—

Name of Variety.	Date Sown.	Date Headed out.	Variety.	Colour.	Average Weight.	Flavour and Texture.	Commenced to Seed.
					Oz.		
White Paris Cos...	April 10	July 8	Cos..........	Light green...	18	Fine flavor, firm heart	July 20
Trianon..........	" 10	" 8	"	Dark green....	16	" ..	" 18
Neapolitan........	" 10	" 5	Curled cabbage	"	17	" ..	" 14
Blond Stonehead..	" 10	" 1	" ..	Light yellow..	16	" ..	" 10
Early Ohio........	" 10	" 1	" ..	" ..	14	" ..	" 20
Marvel or Red Besson	" 10	" 10	" ..	Red edged, dk. yellow......	12	Bitter soft heart	" 18
Trocadero Red-edged	" 10	" 5	" ..	Light green, red edged...	10	Fair flavor, firm heart	" 12
All Year Round, black seeded.....	" 10	" 5	Smooth cab'ge	Dark yellow ..	10	Sweet, fairly firm head	" 12
White Marvel of Cazard..........	" 10	" 7	Curled cabbage	Light yellow..	10	Bitter, fairly firm head	" 15
Brown Stone Head.	" 10	" 3	" ..	Light yellow, red edged...	9	Soft head, slightly bitter.	
All Year Round, white seeded.....	" 10	" 5	Smooth cab'ge	Light yellow..	8	Sweet flavour, firm heart......	" 10
Wheeler's Tom Thumb..........	" 10	" 1	Curled cabbage	Dark green ...	5	" ..	" 10

The following varieties included in this list went to seed before heading out :— White Tennis Ball, Hardy Red Winter, Red Edged Victoria, Algiers, Hammersmith, Green Paris Cos, Forcing Milly.

CABBAGE.

Nine varieties of cabbage were sown in cold frame on April 26, and thinned to three inches apart as soon as they could be handled. They were planted outside on June 6, and as the weather at that period was particularly favourable, nearly all the plants survived.

In the following table they are arranged in the order of their earliness :—

Variety.	Date Sown.	Date Set Out.	Per Cent Headed.	Shape.	Average Weight.	Texture.
					Lbs.	
Paris Market Very Early....	April 25..	June 6..	98	Conical...	7	Firm.
Extra Early Express	" 25..	" 6..	97	" ...	6	Somewhat loose.
Flat Parisian........	" 25..	" 6..	100	Flat..	13	Very firm.
Winningstadt.........................	" 25..	" 6..	97	Pointed ..	8	"
St. John's Day—Early Drumhead... ..	" 25..	" 6..	94	Flat.. .	8	Firm.
Savoy Green Globe............... .. .	" 25..	" 6..	98	Roundish.	$7\frac{1}{2}$	Somewhat loose.
Red Polish Short Stem..................	" 25..	" 6..	87	" .	6	Firm.
Red Large Drumhead	" 25..	" 6..	94	Flat..	8	"
Brussels Sprouts......	" 25..	" 6..	......	Did not mature sprouts.		

CAULIFLOWER.

Seven varieties of cauliflower were sown on April 25 in cold frames, and all germinated well. Transplanting commenced on June 6, and the weather being specially favourable, nearly all the plants survived, as in the case of the cabbage. A noticeable peculiarity of this vegetable during the past season was its late maturing, this being the case generally throughout the province, the late varieties not heading out before frost, and even the earlier ones being much later than usual.

Following will be found the results arranged in tabular form in order of earliness :—

Variety.	Date Sown.	Date Set Out.	Per Cent Headed.	Colour.	Texture.	Average Weight.
						Lbs.
Early Snowball..	April 25..	June 6..	84	White...	Firm and close..	6
Extra Early Paris..	" 25..	" 6..	85	Yellow...	Somewhat open.	$4\frac{1}{2}$
Extra Early Selected Dwarf Erfurt.....	" 25..	" 6..	75	White....	Close......	$7\frac{1}{4}$
Early Paris Nonpareil......	" 25..	" 6..	78	"	"	6
Large Algiers..........	" 25..	" 6..	None.			
Chambourcy Mammoth..........	" 25..	" 6..	"			

PEASE.

Only three varieties of garden pease were tested during the past season. These were sown outside on May 7, in double rows (three feet apart between the double rows). The germination was very poor, and only a small quantity of plants resulted. On examination being made of the small quantity of seed left over from sowing, the fact became apparent that a large proportion of the peas were affected by Pea Weevil. As this is becoming somewhat common of late years, it would seem to point out the advisability of using Manitoba home-grown seed, which is usually a bright, clean sample.

Variety.	Date Sown.	Date Ready.	Length of Pod.	Number of Pease.	Length of Vine.	Flavour.
			Ins.		Ins.	
American Wonder......	May 7..	July 6..	$2\frac{1}{2}$	5—6	10	Very sweet.
Nott's Excelsior.	" 7..	" 7..	$2\frac{3}{4}$	5—6	9	"
Heroine	" 7..	" 20..	$4\frac{1}{16}$	9—10	28	Very fine.

RADISH.

Eleven varieties of radish were sown on May 7, with Planet Junior hand drill, in rows twelve inches apart. The germination of varieties was good, and as we were favored with moist weather during the period of root formation, the flavour and texture was far above the average. All were good, with the exception of Very Early Yellow Turnip and Early White Turnip, which were both somewhat deficient in flavour.

Variety.	Date Sown.	Colour.	Shape.	Flavour.
Forcing Turnip, Extra Early Dwarf..........	May 7....	Red....	Turnip.	Very good.
Forcing Turnip, Scarlet....	" 7....	"	"	Fair.
Early Scarlet..........	" 7 ..	"	Round	Very good.
Early Dwarf Scarlet Olive shaped..	" 7....	"	Olive.	Excellent.
Forcing Scarlet White Tip Turnip.....	" 7....	Red, white t'pd	Turnip.....	Very good.
Olive-shaped Scarlet...................	" 7....	Red.......	Olive.......	Fair.
White Short Leaf Forcing, Olive-shaped	" 7....	White	"	Very good.
Scarlet White Tipped Turnip.....	" 7....	Red........ .	Round	"
Early White Small Turnip.......	" 7 ..	White.. ...	"	Fair.
French Breakfast..	" 7....	Red...... ...	Half long...	"
Very Early Yellow Turnip	" 7....	L. yellow.....	Turnip......	Poor.

CUCUMBERS.

Cucumbers were again an excellent crop. Although the frost on the evening of June 6 completely destroyed the first sowing, the second sowing on June 7 made such rapid progress that they were very little behind average years in point of maturity. Four varieties were sown in the open, in hills 5 feet apart each way, and the germination was good in all instances.

The results are given in order of earliness :—

Variety.	Date Sown.	Date Ready.	Length.	Diameter.	Productiveness.	Average Weight.	Colour.	Shape.
			In.	In.		Oz.		
Early Cluster	June 7	Aug. 12	7	$2\frac{1}{2}$	Very productive	10	White..	Straight.
Paris Pickling.........	" 7	" 12	9	$2\frac{1}{4}$	"	7	Green ..	Twisted.
White Wonder.........	" 7	" 12	7	$2\frac{1}{2}$	"	10	White..	Straight.
Evergreen White Spine	" 7	" 12	8	3	"	8	Green ..	"

PUMPKINS.

Two varieties of pumpkins were sown in the open on May 21, in hills 10 feet apart, This sowing was destroyed on June 6 by frost, and resown on June 7. A good crop was harvested from the late sowing.

Variety.	Date Sown.	Date Ready.	Colour of Skin.	Colour of Flesh.	Average Weight.	Productiveness.	Flavour.
					Lbs.		
Connecticut Field......	June 7	Aug. 20	Yellow.	Yellow.	20	Very productive	Fair.
Japanese Pie.....	" 7	" 25	"	"	13	Fairly "	Excellent.

SQUASH.

Three varieties of squash were sown the past season on May 21, in the open, in hills ten feet apart. The first sowing was destroyed by frost on the evening of June 6, and was resown on June 7. The late sowing produced a very satisfactory crop, in all respects, and two varieties ripened.

Variety.	Date Sown.	Date Ready.	Colour of Flesh.	Colour of Skin.	Average Weight.	Ripened.
					Lbs.	
Long White Bush Marrow..	June 7..	Aug. 14..	White....	White....	10	Seed ripened.
English Vegetable Marrow..	" 7...	" 14..	"	"	8	"
Hubbard..........	" 7...	" 14..	Yellow....	D. green..	12	Green.

The White Bush Marrow seems to be the most desirable variety for Manitoba.

CARROTS.

Four varieties of carrots were sown on May 7, with Planet Junior hand drill, in rows eighteen inches apart. The crop was by far the most satisfactory of any recorded here for years, the roots being remarkably smooth and of good size. The long varieties again proved their inferiority, the yield being small, and necessitating much labour in pulling.

Variety.	Shape.	Colour.	Flavour and Texture.	Date Lifted.	Average Weight.	Yield per acre.	
					Lbs.	Bush.	Lbs.
Luc Half Long. Scarlet.........	Half long.....	Red......	Very good	Sept. 28	1¼	671	51
Parisian Forcing, Red	S. stump rooted.	"	" .	" 28	9	484	..
French Horn	" .	l. red.....	Fair......	" 28	1½	443	40
Long Blood Red	Very long.......	"	Good.....	" 28	8	265	

BEETS.

Five varieties of beets were sown with Planet Junior hand drill, in rows thirty inches apart, on May 17. The germination was good in all cases, the product being well up to the average in quality. The long varieties were (as usual) superior in colour and texture.

Variety.	Date Sown.	Date Ripe.	Colour.	Average Weight.	Flavour and Texture.	Shape.	Yield per Acre.	
				Lbs.			Bush.	Lbs.
Long Smooth Deep Blood Red.	May 17.	Sept. 28	Deep red narrow rings.	6½	Very fine.	Very long.	773	23
Early Blood Red Turnip.	" 17.	" 28	Wider rings, considerable white	4¼	Fair......	Turnip....	655	36
Black Queen.........	" 17.	" 28	Deep red wide rings...	2½	Very fine.	Long.....	382	48
Egyptian..........	" 17.	" 28	Wide rings, very white	1½	Coarse....	Flat......	268	24
Dell's Black Leaf....	" 17.	" 28	Deep red narrow rings.	6½	Very fine.	Very long.	110	..

SWEET HERBS.

Three varieties of sweet herbs were sown on May 7, with Planet Junior hand drill, in rows eighteen inches apart, sage, savory and thyme, the latter failed, however, to germinate, a common occurrence with this herb. The others grew with their usual luxuriance.

SALSIFY.

This vegetable was as usual below the average ; the roots being very small and rough.

BEANS.

Six varieties of French beans were sown outside on May 21, in rows thirty inches apart, viz.: Fame of Vitry, Emperor of Russia, Dwarf Extra Early Edible Podded, Bagneolet Dwarf Black Speckled, Canadian Wonder, Flageolet Scarlet wax. All germinated well but were completely destroyed by the frost on the evening of June 6, 1901. A resowing was made on June 7, but owing to all the seed having been used for the first sowing, a substitution of varieties had to be made, prccured from a local seedsman.

Variety.	Date sown.	Date ready.	Colour.	Length of pod.	No. of Beans.	Flavour and texture.	Productiveness.
Golden Wax	June 11	Aug. 17	Yellow.	6	3—4	Very tender.	V. productive.
Early China	" 11	" 18	"	5	3—4	"	Fairly "
Flageolet Scarlet Wax	" 11	" 20	"	6	4—5	"	Very "
Mammoth Red German Wax	" 11	" 30	"	7	4—5	"	" "

TURNIPS.

Garden turnips were a much more satisfactory crop this season than for several years past. Their quality for table use being better than usual, doubtless on account of the moist season. Three varieties were sown with Planet Junior hand drill, on May 21, in rows thirty inches apart, and the following results were obtained :—

Variety.	Date sown.	Date ready.	Colour.	Shape.	Flavour
Early White Strap Leaved American Stone	May 21	July 15	White..	Long	Good...
Early Stone or Stubble Green Top	" 21	" 17	"	Round	"
Half Long Early White Vertus	" 21	" 20	"	Half long	Fair....

TOMATOES.

The comparatively open fall of the past season was very favourable to tomatoes, and a moderate quantity of ripe fruit was harvested. Two varieties were sown in hot-bed on April 25 and transferred to the open on June 14, nearly all the plants surviving. Dwarf Champion produced the first ripe fruit, but before frost Earliest of All proved the most productive.

Variety.	Date sown.	Date ripe.	Ripe fruit.	Green fruit.	Total.	Shape.	Flavour.
			Lbs.	Lbs.	Lbs.		
Earliest of All	April 25	Aug. 30	25	17	42	Somewhat ribbed.	Good.
Dwarf Champion	" 25	" 24	18	12	30	Smooth	Very good.

INDIAN CORN.

Three varieties of Indian corn were sown on May 21, in hills three feet apart by two feet, with Planet Junior hill dropping drill. Through severely cut by the frost on June 6, the majority of the plants survived, though the check made them somewhat late. None of the varieties ripened seed.

Variety.	Date sown.	Date ready.	Length of cob.	Variety.	Weight per dozen.	Flavour.
					Lbs.	
Cory	May 21	Aug. 15	7	10-rowed dent	$4\frac{3}{4}$	Excellent.
Mitchell's Extra Early	" 21	" 20	8	8-rowed flint	4	Fair.
First of All	" 21	" 20	$6\frac{3}{4}$	10-rowed flint	$4\frac{1}{2}$	Excellent.

ASPARAGUS.

The asparagus crop was particularly satisfactory during the past season. Commencing to shoot on May 6, it continued uninterruptedly for two months, its luxurious shoots being produced in profusion. All varieties did well—Barr's Mammoth being somewhat the largest yielder. Four varieties were grown, namely : Conovor's Colossal, Columbus Mammoth White, Barr's Mammoth and Giant Argenteuil.

CITRONS.

This vegetable, which is in much demand in Manitoba for preserving, gave an enormous yield during the past year. One variety was sown, viz. : Preserving, and from one row, 96 feet long, 473 pounds were gathered. Taking into consideration the fact that the first sowing was frozen out on June 6, the yield was a remarkable one.

PARSNIPS.

The parsnip crop was decidedly above the average this season, only one variety 'Hollow Crown,' was sown, with Planet Junior hand drill, in rows thirty inches apart, on April 10. The crop was harvested on October 12, and was of excellent quality, the yield being $755\frac{1}{3}$ bushels per acre, calculated from the product of two rows, each 66 feet long.

SPINACH.

One variety, namely, 'Long Standing,' was sown on April 10, in rows eighteen inches apart. The product was of fine flavour and remained in condition for table for a comparatively long period. This vegetable comes in very opportunely in the early part of the season, when vegetables are somewhat scarce.

PARSLEY.

One variety, 'Extra Curl,' was sown on April 10, and gave, as usual, an excellent crop. A number of complaints are received here annually with reference to its non-success generally, but in nearly every instance late sowing was the cause of the trouble. To obtain the best results with parsley the sowing should be done as early as possible in the spring.

THE FLOWER GARDEN.

The flower garden was very satisfactory, and a continuous mass of bloom throughout the season. The weather during the early spring months, was favourable for hot-bed work, and a very fine stock of bedding plants were ready for transplanting to the open at the end of May. The first sowing was made on April 2, and concluded on the 25th, transplanting being brought to a conclusion on May 10. Bedding out commenced on June 3, and was well under way, when we were visited by the cool wave on June 5 and 6, previously referred to, and which caused much damage in this department. Many of the newly bedded annual flowers were frozen, and necessitated a replanting, which fortunately we were able to accomplish by reason of having surplus stock reserved for contingencies. Zinnias and Dahlias were the most seriously injured, and were cut to the ground, while all varieties were more or less affected. On the return of fine weather, however, many of the plants recovered, and very soon all trace of the damage was obliterated ; and the long open fall compensated in a great measure for the check sustained at this period. The Herbaceous perennials were much admired, and the number of varieties of this class now growing here constitute a very comprehensive collection.

Variety.	How Sown.	Date Sown.	Date Transplanted.	Flowering Period.
Asters (10 types)	Boxes, hotbed.	April 8	June 3 to June 15.	July 5 to frost.
Amarantus superbus	" "	" 8	" "	Ornamental leaved.
" bicolor	" "	" 8	" "	" "
Ageratum Mexicanum	" "	" 8	" "	July 3 to frost.
Antirrhinum majus	" "	" 8	" "	June 30 to severe frost
" " nanum	" "	" 8	" "	" "
Abronia umbellata	Outside	May 25	Not	July 1 to frost.
Brachycome iberidifolia	Boxes, hotbed.	April 17	June 3 to June 15.	June 25 to frost.
Cosmos hybrida	" "	" 8	" "	Did not flower.
Celosia (3 varieties)	" "	" 10	" "	July 10 to frost
Chrysanthemum coronarium	" "	" 10	" "	" 1 "
" frutescens	" "	" 10	" "	" 10 "
" carinatum hybridum Burridgeanum	" "	" 10	" "	" 3 "
Dahlias, single	" "	" 8	" "	" 10 "
Gaillardia picta	" "	" 15	" "	June 25 to frost.
" Lorenziana	" "	" 15	" "	" 25 "
Godetia nana	Outside.	May 25	Not	" 20 "
Helichrysum bracteatum	Boxes, hotbed.	April 10	June 3 to June 15.	July 15. Everlasting.
Nicotiana affinis	" "	" 10	" "	June 20 to frost.
Nigella damascena	" "	" 12	" "	" 15 to July 5.
Portulaca double	Outside.	May 25	Not	" 25 to frost.
Phlox Drummondii	Boxes, hotbed.	April 8	June 3 to June 15.	" 10 to severe frost.
Petunias, single mixed	" "	" 30	" "	July 3 "
" double "	" "	" 30	" "	" 3 to frost.
Salpiglossis variabilis	" "	" 15	" "	" 1 "
Stocks, double German 10 weeks	" "	" 17	" "	" 5 "
" " large flowering	" "	" 17	" "	" 5 "
Scabiosa major	" "	" 10	" "	June 20 "
" minor	" "	" 10	" "	" 20 "
Verbena hybrida auriculæflora	" "	" 17	" "	July 10 to severe frost.
Zinnia elegans	" "	" 25	" "	" 10 to frost.

The delay in the sowing of Petunias was due to the late arrival of seed, but as pains were taken to push the plants along, very little time was lost, and the results were particularly fine. The double flowers included the finest we have ever grown here, being very large, compact and beautifully fringed. Special attention is called to the Scabiosa (Sweet Scabious), an annual not generally cultivated here, but which is worthy of more attention. It is very hardy, and its varied coloured flowers of rich

texture render it quite conspicuous. It also has a very delicate fragrance. In Asters two types, Queen of the Earliest and Queen of the Market, are deserving of special mention. Both of these are very early and desirable. Another point to which we would draw attention is the desirability of growing the single dahlias from seed and treating them as annuals. They are exceptionally easy of propagation and very vigorous growers, and if sown early in April, will be covered with flowers about the middle of July of brilliant colouring and rich texture, their long stems rendering them invaluable for cutting.

Annuals sown outside.—As many people do not care to go to the trouble of making a hot-bed, a test was made during the past season to ascertain what varieties of annuals could be successfully grown by sowing them in the open. The result is given below, and shows clearly that a very pretty garden may be had without the necessity of a hot-bed. The seed was sown on April 25, in well prepared beds, in rows varying from twelve to twenty-four inches apart, according to the expected growth of the variety, and thinned out to six inches apart in the row as soon as the seedlings could be handled. Care should be exercised in regard to the distance apart of the rows, in order to avoid overcrowding when the maximum growth has been obtained.

Name of Variety.	Remarks.
Asters Truffauts Pæony Perfection	Flowered well ; made good show.
" Queen of the Earliest	" for long season.
" " Market	" "
" Imbricated Pompon	" well ; made good show.
" Single Large Flowering	" "
" Pyramidal Bouquet	" "
" Perfection	" "
" Lilliput	" "
" Dwarf Multicolor	" "
Amarantus Superbus	Ornamental leaved ; made fine plants.
Ageratum Mexicanum	Flowered well.
Abronia umbellata	"
Brachycome iberidifolia	" early and well and made fine show.
Calendula officinalis	" early and exceptionally well.
Cosmos Hybrida	Did not flower.
Celosia pyramidalis nana	Flowered well.
Chrysanthemum Coronarium	" early and well.
" frutescens	" well.
" carinatum Burridgeanum	" early and well.
Godetia nana	" exceptionally well and made fine show.
Helichrysum bracteatum	" somewhat late.
Nigella damascena	" exceptionally well and made very fine show.
Pansy (Bedding mixture)	" well.
Portulaca Double Large Flowering	" exceptionally well and made very fine show.
Phlox drummondii grandiflora	" " "
Salpiglossis variabilis	" " "
Gaillardia picta	" " "
" " Lorenziana	" " "
Nicotiana affinis	" well.

SWEET PEAS.

A collection of named varieties were sown the past spring with excellent results. All flowered well. The following varieties were considered the most striking :—

Othello.—A very large flower, deep crimson in colour.

Prince Edward of York.—Carmine scarlet, with crimson wings.

Aurora.—Striped rosy orange on white ; a most attractive variety.

Lottie Hutchins.—Pencilled pink on a straw yellow.

Salopian.—Rich deep crimson red, very large and of fine form.

Sadie Burpee.—The best of the white varieties.

Hon. F. Bouverie.—Salmon, with creamy pink wings.

Lady Nina Balfour.—A beautiful silvery lavender.

Admiration.—Pinkish heliotrope, wings a shade lighter.

HERBACEOUS PERENNIALS.

This class of plants continue to attract special attention, on account of their hardiness and ease of cultivation. The former situation of the perennial bed having been found undesirable, a new location has been selected, to which the old plants have been removed, and in which new varieties are being planted as fast as procured. The following varieties were received during the spring of 1900, and the appended notes show their condition after having passed through one winter. Most of them flowered nicely in their season :—

Asclepias tuberosa.
Aster, W. Bowman.
" White Queen.
Achillea Millefolium rubrum.
" Sibirica White.
" Ptarmica Fl. Pl.
Amthemis tinctoria kelwayi.
Artemisia Stellariana.
Anemone Narcissiflora.
Ajuga reptans atropurpurea.
" genevensis
Boltona latisquama.
" Asteroides.
Campanula altaica.
Chelone barbata.
Centaurea montana alba.
" macrocephala.
Coreopsis verticillata.
" Delphinifolia.
Erigeron macranthus.
Funkia lancifolia.
Geranium maculatum.
" Wilfordi.
" Sanguineum.
" platypetalum.
Helenium Grande striatum
Helianthus maximiliana.
" gigantea.
Hemerocallis disticha Fl. Pl.
" fulva.
" variegata.
" Kwanso Fl. Pl.
" graminæfolia.
" dumortieri.
Iris variegata arquinto.
" " Pancrace.
" " Minos.
" " Innocenza.
" " Coquette.
" " Darius.
" " Souvenir.
" " Henry Havard.
" "
" squalens.
" " Jacquesiana.
" " Lady Seymour.
" " La Tristesse..

Iris squalens, Tarquin.
" " Minerva.
" " Hector.
" " Haydee.
" " Dina.
" " Bronze Stoffel.
" " La Marmora.
" " Cerberus.
" amoena Julia Grise.
" " Maria Theresa.
" " Crebillon.
" " Victor Lemoine.
" " Mrs. H. Darwin.
" plicata.
" " Severtii.
" " Lord Seymour.
" " Gisela.
" neglecta Sapho.
" " Arlequin Milanais.
" " Agathe.
" " Hericartiana.
" pallida.
" " Chamœleon.
" sibirica.
" " violacea.
" " alba.
" " hæmatophila.
" germanica.
" " Verschuur,
" pumila.
" " lutea.
" " Cinerea.
" " gracilis
" Florentina.
" ensata.
" " Biglumis.
" " oxypetala.
" cristata.
" nudicaulis.
" furcata.
" Goldenstadtiana coerulescens.
" giganteus.
" flavescens.
" virescens.
" aurea.
" Balkana.
" Chamæiris.

Iris biflora.
" blondovi.
" ruthenica.
" Cengialti.
" orientalis.
" Hungarica
" prismatica.
Lysymachia clethroides.
Physostegia Virginiana alba.
Pyrethrum uliginosum.
Phalaris arundinacea fol var.
Phlomis fruticosa.
Papaver orientale.
Phlox decussata pantheon.
" " tourbillon.
" " dwarf white.
" carolina ovata.
" amœna.
" divaricata.
" subulata lilacina.
" reptans.
" pilosa.
Poterium officinale.
Rudbeckia laciniata.
Spirea venusta pallida.
" kamschatka.
" filipendula.
" " fl. pl.
" palmata.
" ulmaria.
" digitata glabra.
" ulmaria fl. pl.
" pubescens.
Symphytum asperrimum.
Sidalcea candida.
Sempervivum montanum.
Solidago rigida.
" Missouriensis.
" gigantea.
Thermopsis caroliniana.
Tradescantia virginiana alba.
" " cœrulea.
Valeriana officinalis.
Veronica virginica.
" elegans carnea.
" spicata.

BULBS PLANTED 1901.

A consignment of bulbs were received from the Central Experimental Farm this autumn and were planted in the perennial block. They consist of : Tulips, in varieties; Crocus, Scilla's, Iris Hispanica, Snowdrops, and Frittilaries.

A covering of manure was placed on the bed, and the results will be reported on the next season. A consignment of Hyacinths, Narcissus and Lilium candidum were potted and will be flowered in the Superintendent's house during the winter. A supply of different sorts of Lilies were also received from Ottawa.

DISTRIBUTION OF GRAIN, POTATOES, ETC.

A larger distribution than usual was made of potatoes, maple seed, rhubarb, flower and brome grass seed.

The following quantities were sent out to applicants :—

Grain of all kinds in 3-pound bags	555
Seedling trees, packages	310
Shrubs, packages	113

Distribution of Potatoes, &c.

Potatoes in 3-pound bags	334
Maple seed in 1-pound bags	471
Rhubarb seed, packages	217
Flower seed, packages	201
Brome grass seed, in 1-pound packages	270

Box Elder or Manitoba Maple Seeds.

The following reports have been received from parties to whom Manitoba Maple seeds were sent in 1-pound packages, during the spring of 1900 :—

Number of applicants supplied	240
Number of reports received	89

	Success.	Failures.
Seeds sown on summer fallow	3	12
" Spring ploughing	20	6
" Fall ploughing	22	11
" Breaking	9	3
" Garden (dug with spade)	3	..

Largest number of plants raised from 1-pound packet, 2,000.

Maximum height of seedlings at end of season, 2½ feet.

Reports of Distribution of Collections of Trees, Spring 1900.

Only eight per cent of parties supplied with trees reported on them. These all report having received the packages in good condition.

Number of applicants supplied	525
Number of reports received	43

Average per cent of cuttings struck :

	Per cent.
Russian Poplars	20
Cottonwoods	34
Willows	13

Maximum growth, summer 1900 :

	Feet.
Russian Poplar	4
Cottonwood	3
Willows	3

PROPAGATION OF TREES FOR DISTRIBUTION.

Caraganas, Russian Poplars, Elms, and Willows, were grown for free distribution. The Caraganas were propagated from seed. The seed was sown the same as garden peas, in rows thirty inches apart, about one inch deep and about one inch apart in the rows. Fresh gathered Elm seed was sown in shallow drills 12 inches apart and covered with fine soil by means of a garden rake.

PROPAGATION OF TREES FOR THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR.

Under your instructions some ten acres of land was set apart for the growing of trees for the above department.

The principal part of these were Native Ash-leaved Maples, grown from seed, but a number of Elms and Willows were also grown.

The Maple seed was sown in drills three feet apart, the seeds touching each other in the row. Most of the seed was soaked before sowing. In some instances the seed was ploughed under, by striking out a furrow three inches deep and placing the seed at the bottom of the furrow, and ploughing a second furrow over it. Adjoining rows were struck out with a Planet Junior drill two inches deep, and the seed sown by hand and the soil filled in with a rake. The rows covered with the plough produced 160 trees to the chain of row, and the rows filled in with rake 733 trees to the chain. Either the ploughing was too deep, or else the soil when thrown in with a plough was too hard and lumpy for the best results. Altogether 110,000 maples and elms were grown from seed, and in addition seedling elms were collected from the natural bluffs by the river side.

SAMPLES FOR EXHIBITION PURPOSES.

Five cases of samples were sent to the Glasgow Exhibition during the past year. These were exhibited along with samples from the other Experimental Farms, and received very favourable notices.

Last fall an additional exhibit was prepared from the crop of 1901, and forwarded to Glasgow; although not as extensive as the first exhibit, it gave a very fair idea of the character of the past year's crop.

On completion of the Dominion Government building on the Brandon fair grounds this year, a very complete exhibit was prepared and installed therein, and the display was greatly augmented by a tasty exhibit from the Central Experimental Farm at Ottawa.

A small collection of samples was sent to the Dominion Government agency in Texas.

A somewhat extensive display of Horticultural products was made at the Brandon Horticultural Exhibition.

NEW BREAKING.

About three acres of pasture field which had been in Western Rye Grass for eight years was broken up in the spring, thoroughly disc-harrowed, and at once re-sown with Brome Grass seed in the proportion of fifteen pounds of seed per acre. A good

catch was obtained and furnished abundance of pasture from early August until winter set in. Two acres of original prairie in the same field was also broken up, backset and harrowed. This will be sown to brome seed early next spring. It is not found necessary to keep the cattle out of a field when sowing a portion of it with brome grass. No doubt it would be advisable to do so for the first few months if the land were at all wet; otherwise there would be danger of tramping out the young grass plants.

VISITORS.

The number of visitors to the Experimental Farm during this year approximated ten thousand.

A noticeable feature was the large number of delegates from the Western and South-western States. These were representative farmers sent to examine and report on the Canadian North-west as a desirable location for the surplus population of their respective States. They appeared greatly impressed by the crops of grain and grasses growing on the Experimental Farm.

Two railway excursions were run to the farm during the year, one along the main line of the Canadian Pacific Railway from Rosser west, and the other from the south-western branches of the Canadian Pacific Railway. Each excursion carried about six hundred, nearly all being farmers and their families.

The provincial ploughing match and farmers' picnic were also held on the farm, and largely attended. The ploughing matches are already exerting an influence for good in the province, and the ploughing done has greatly improved in late years.

FARMERS' MEETINGS.

A number of farmers' meetings were attended during the past year, and the turn-out of farmers was much above the average, the attendance in some instances reaching four hundred.

Meetings were attended at the following places :—

Winnipeg	Jan. 18	Cartwright	Feb. 7
Brandon	" 19	Winnipeg	" 20
Carman	" 29	"	" 21
Miami	" 30	"	" 22
Nelson	" 31	MacGregor	Mar. 16
Morden	Feb. 1	Winnipeg	April 16
Manitou	" 4	Rapid City	May 25
Pilot Mound	" 5	Brandon	July 24
Crystal City	" 6	Winnipeg	" 31

METEOROLOGICAL TABLES.

Month.	Highest Temperature		Lowest Temperature		Total Rainfall.	Total Snowfall.	Total Amount of Sunshine.
1900.	on	°	on	°	Inches.	Inches.	Hours.
December	21	39·4	31	−28·6	....	12	86·3
1901.							
January	13	38 2	2	−41·6	.. ...	17	99·1
February	13	25 5	2	−25	....	....	126·9
March	29	41 2	5	−18·5	....	....	166·4
April	30	85	18	13	....	....	170·8
May	28	92	13	28	1·12	....	330·3
June	1	85·5	7	26·5	7·72	....	182·5
July	19	92·5	1	44	1·93	....	243·6
August	16	92	30	40·1	1·13	....	286·1
September	2	91·2	18	22	3·34	....	127·5
October	24	78·9	27	21	63	....	183·8
November	1	53	22	1	11	3	109
Totals	....	....	....	....	15·98	32	2,112·3

CORRESPONDENCE.

This year 4,804 letters were received and 3,210 despatched, irrespective of 2,755 circulars sent out.

I have the honour to be, sir,

Your obedient servant,

S. A. BEDFORD,

Superintendent.

EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

REPORT OF ANGUS MACKAY, SUPERINTENDENT.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T,
November 30, 1901.

DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa, Ont.

SIR,—I have the honour to submit herewith the fourteenth annual report of the operations on the Experimental Farm for the North-west Territories, at Indian Head, Assiniboia, during the year 1901.

The past season has been one of the most successful ever experienced, not only on the Experimental Farm, but throughout the whole country. Bright prospects from beginning to end of the growing season consummated in the most abundant crop ever reaped in any country, and although unsettled weather for a time caused some fears for the safety of the reaped grain, the conditions became more favourable when the real North-west fall opened, and in proportion to the total amount of grain saved in good condition the loss is very slight.

Last winter was mild with few or no storms. Snow fell in the middle of November, and in some districts remained on the ground until April ; while in others it disappeared in March.

On account of the wet condition of the land when it froze up in the fall of 1900, and the frequent rain and snow storms during April, seeding was late in starting, but from the beginning to the end of May, while seeding was in progress, the weather and soil conditions were all that could be desired.

June opened hot and dry, and some apprehension was felt for the young grain plants, but a rain which was general throughout the Territories on the 12th, followed by warm and frequently heavy showers continuing to the end of July, caused a remarkable growth of cereals in every part of the Territories. In previous years some districts have been more favoured than others in this respect, but this year all have fared alike.

Harvest commenced from the 15th to the 20th of August, and was completed early in September. No frost was reported till the 17th, by which time all grain, except some late oats, was in stook.

There were no heavy winds during the season, and no injury was sustained by the grain at any time.

Shortly after stacking and threshing had commenced, in Assiniboia at least, heavy falls of rain and snow took place and caused delay in securing the grain, as well as more or less loss in badly stacked and stooked grain. The unfavourable weather, with occasional bright days, continued to October 13, when a radical change took place, and from that time to the present not a day has been lost.

Many very heavy yields of grain are reported from almost every part of the Territories. In Assiniboia, where wheat is the principal crop, yields of 50 to 55 bushels per acre have been threshed from fields of 100 acres or over, in the Indian Head, Wide-awake and Abernethy districts ; while many farmers have secured 40 to 45 bushels per acre, in some cases on four to six hundred acres.

In the Regina, Pense, Moosejaw and Sintaluta districts equally heavy crops have been harvested. One family of father and six sons in the Pense district are reported to have between seventy-five and eighty thousand bushels of wheat to market.

Settlers with ten, fifteen or twenty thousand bushels are numerous in the districts mentioned, and no doubt the same may be said of the more easterly portion of Assiniboia, although I have no direct information in the matter.

The newly settled districts along the Soo line of railway have been equally fortunate, and a large influx of settlers is expected in the districts north of Weyburn, Milestone and Yellow Grass as soon as spring opens next year.

Saskatchewan reports a good crop of wheat and oats, and Alberta has the heaviest crop of oats it has ever secured. .

The oat crop throughout the Territories is a heavy one. The majority of farmers in the wheat-growing sections have paid little attention to this important cereal, being content to sow on stubble land with little or no cultivation and thresh from 30 to 50 bushels per acre ; whereas, some, and the number is increasing, are using fallowed land and securing 75 to 100 bushels. In several instances the yield has been over 100 bushels per acre this year.

Fallowed land, the past season, as in every other year, has given the highest yield of wheat per acre, and so far as can be ascertained, the crop grown thereon has sustained no injury from rust, smut or other cause. In some cases the quantity of straw was excessive and lodged in places, but this apparently has had no appreciable effect on the yield.

Grain sowed on stubble land ploughed or cultivated in the fall of 1900 or just before seeding, invariably gave good returns ; while on similar land without cultivation the yield was comparatively light.

Cattle throughout the Territories have not done as well during the past season as in 1900. Flies and soft grass are no doubt accountable for this to a considerable extent. The heavy rains in June and July made the grass soft and watery and caused a most abundant crop of mosquitoes and flies. The price of export steers has kept up, but the demand for stockers has not been so brisk as in former years.

EXPERIMENTAL FARM CROPS.

The crops on the Experimental Farm the past season were, without an exception, the best since the commencement of operations in 1887. Everything grown yielded above the average and many varieties of grain were above any previous record. The sample too, surpasses that of any other year.

Pasture, hay, corn, potatoes, vegetables and roots (with the exception of field carrots, which although above ordinary years, were not in keeping with the other crops), were a most gratifying success.

All the tests made with grain, roots, fodder-plants, &c., came through the season without a single set-back from winds, frost or other causes, and all have been safely secured and threshed in good condition.

Small fruits were a fair crop, and crab-apples and plums produced abundantly.

Trees and shrubs of all kinds made a strong, healthy growth.

EXPERIMENTS WITH SPRING WHEAT.

Seventy-one varieties were tested on 1-20th or 1-40th acre plots ; eight of the same varieties on plots ranging from $\frac{3}{4}$ acre to 10 acres. Red Fife was used in the test of fertilizers ; rotation test ; test of sowing selected, well-cleaned and small seed, and in the test of blue stone as a preventive of smut.

TEST OF VARIETIES IN UNIFORM PLOTS.

Seventy-one varieties, of which fifty had been previously tested and twenty-one were new sorts, were sown on May 7 by hoe-drill, at the rate of one and one-half bushels per acre.

The field chosen for this test of wheat, as well as for the uniform plots of oats and barley, was one of twenty acres entirely surrounded by wind-breaks of trees, and is of a uniform quality of soil—a clay loam. Wheat seeding was later than it otherwise would have been on account of wet spots in the field.

The land had been well fallowed in 1900, having received one deep ploughing in May, and several surface cultivations during the growing season. No weeds were allowed to grow and after the grain appeared above ground, the plots were gone over several times and anything injurious to the crop was removed.

All the varieties germinated evenly and well, and made a strong, healthy growth, without sustaining the least injury from smut, rust, frost or any cause whatsoever. A few days before being cut, rust appeared on the leaves of some of the varieties but the grain was not affected.

WHEAT—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.	
Mason	Aug. 19	104	47	Weak	5	Bald	5,000	67	..	63½	Slightly.
Australian No. 13	" 24	109	50	Strong	4	"	5,240	66	40	69½	
Huron	" 23	108	48	"	4	"	5,440	66	40	62½	"
Countess	" 18	103	54	"	4	" "	5,980	65	20	59½	
Goose	" 29	114	50	Medium	2½	Bearded	4,380	63	..	65	
Rideau	" 22	107	44	"	3¾	Bald	4,980	62	40	62	"
Rio Grande	" 29	114	53	Strong	4½	Bearded	6,620	62	..	59	"
Stanley	" 20	105	52	"	4	Bald	5,960	61	40	62½	
Essex	" 24	109	55	"	4½	"	4,800	61	20	60	
Dawn	" 20	105	47	"	3	"	3,650	61	..	64	
Clyde	" 17	102	56	"	4¼	"	5,360	60	40	62½	
Beaudry	" 25	110	53	Weak	3½	Bearded	4,910	60	40	64	"
Minnesota No. 181	" 25	110	53	Strong	4	Bald	5,880	60	..	62	
Vernon	" 26	111	46	Medium	3	Bearded	6,280	59	20	63	"
Minnesota No. 149	" 24	109	51	"	4	Bald	6,320	59	20	57½	
Dion's	" 23	108	55	Strong	5	Bearded	6,180	59	20	61	"
Australian No. 23	" 23	108	52	"	4¼	Bald	6,180	58	40	61½	
Beauty	" 20	105	54	"	5	"	6,480	58	40	59	"
Speltz	" 17	102	46	Weak	2	"	2,275	58	20	46½	
Colorado	" 28	113	49	"	3½	Bearded	3,750	58	20	63	"
Dufferin	" 26	111	54	Medium	4¼	"	4,700	58	..	62	
Minnesota No. 163	" 24	109	52	Strong	4	Bald	6,420	58	..	62½	
Australian No. 27	" 21	106	53	"	4¼	"	7,000	58	..	60	
Weldon	" 17	102	53	"	4¼	"	6,880	57	40	62	"
Wellman's Fife	" 24	109	59	"	4¾	"	5,040	57	40	61¾	
Monarch	" 25	110	52	Medium	5	"	6,600	57	40	58	
Roumanian	" 27	112	52	"	3¼	Bearded	3,820	57	20	65¼	
Minnesota No. 169	" 26	111	53	"	4	Bald	5,200	57	20	60½	
Red Fern	" 28	113	55	"	5	Bearded	3,980	57	20	63	
Herisson Bearded	" 28	113	46	Weak	2½	"	3,660	57	20	63½	"
Percy	" 18	103	51	Strong	4	Bald	4,160	57	20	61½	
Preston	" 29	114	47	"	3	Bearded	4,880	57	20	63½	
Hastings	" 24	109	49	Medium	3½	Bald	3,360	57	20	63½	
Red Fife	" 25	110	52	Strong	3½	"	5,220	57	..	61½	
Advance	" 25	110	52	"	4	Bearded	5,370	57	..	62¾	
Hungarian	" 26	111	49	Weak	3	"	3,520	56	40	61¾	
Japanese	" 23	108	52	Strong	3½	"	4,520	56	40	60½	
Australian No. 19	" 23	108	48	Medium	3½	Bald	6,280	56	40	60½	
Pringle's Champlain	" 26	111	50	"	5	Bearded	7,120	56	40	62½	"
Admiral	" 23	108	53	Strong	4	"	5,980	56	20	62½	"
Campbell's White Chaff	" 23	108	54	Weak	3½	Bald	4,560	56	..	62½	"
Ladoga	" 22	107	50	Strong	3½	Bearded	3,280	55	40	62½	

WHEAT—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.	
White Connell	Aug. 24..	109	55	Strong	4	Bald ...	3,420	55	20	62	
Blair	" 19..	104	49	Weak ..	3½	" ...	4,300	55	..	62½	Slightly.
Crawford	" 14..	99	49	Medium	3	" ...	5,160	55	..	62½	
White Russian	" 20..	105	57	Strong .	4¾	" ...	5,580	54	..	61½	
Progress	" 20..	105	52	" ..	4	" ...	3,560	54	..	62½	
Laurel	" 26..	111	51	Weak ..	5½	" ...	5,120	54	..	57½	
Cassel	" 23..	108	47	Strong .	3½	" ...	3,200	54	..	63	
Australian No. 25	" 22..	107	52	" ..	4¼	" ...	4,900	54	..	59½	
Blenheim	" 26..	111	53	" ..	4¼	Bearded	5,175	54	..	62	
Alpha	" 25..	110	50	" ..	3½	" ...	5,650	53	40	62	
Fraser	" 15..	100	51	Medium	3	" ...	3,780	52	..	62	
Bishop	" 21..	106	51	Strong .	4½	Bald ...	4,480	52	..	62½	
White Fife	" 19..	104	55	" ..	5	" ...	5,720	52	..	61½	
Plumper	" 22..	107	48	Medium	3¼	Bearded	4,540	51	..	63½	
Chester	" 23..	108	43	" ..	3¾	Bald ...	4,440	50	40	61	
Australian No. 9	" 22.	107	50	Strong .	4	" ...	5,080	50	40	59	
Captor	" 23..	108	54	" ..	4¾	" ...	5,780	50	20	62½	
Ebert	" 14..	99	46	Medium	3½	" ...	5,220	50	20	64	
Crown	" 24..	109	54	" ..	4¼	" ...	3,590	50	..	62¾	
Benton	" 23..	108	50	Strong .	4	" ...	4,160	49	20	63	
Robin's Rust-proof	" 27..	112	44	Weak ..	3¾	" ...	4,800	49	20	64½	Badly.
Red Swedish	" 29..	114	48	" ..	4	Bearded	4,080	49	..	63½	Slightly.
Early Riga	" 13..	98	48	Medium	3½	Bald ...	4,100	49	..	63½	
Australian No. 10	" 23..	108	47	Strong .	3¼	" ...	6,100	48	40	63	
Harold	" 15..	100	43	Medium	2½	Bearded	4,160	48	..	64	
Angus	" 25..	110	45	Strong .	3½	Bald ...	2,840	46	..	62	
Norval	" 19..	104	52	" ..	3¾	Bearded	3,880	45	40	61	
Cartier	" 21..	106	44	" ..	4	" ...	4,040	44	40	63	
Byron	" 18..	103	46	" ..	3½	" ...	4,200	43	40	61¾	

NOTE.—Where the foregoing are noted as 'slightly rusted' it applies to the leaves, as the straw was not in any way affected.

TEST OF VARIETIES IN FIELDS.

Eight varieties of wheat were sown on plots of three-fifths to ten acres of land worked in various ways as shown in the accompanying table.

The fallow land was ploughed seven inches deep in May, 1900, and cultivated four times during the season.

The Brome backsetting was Brome sod broken two inches deep in June ; backset four inches deep in August, and cut up with disc-harrows after harvest. A few of the grass-roots sprouted in the spring, but unless closely looked for could not be noticed in the crop.

The stubble land had been ploughed seven inches deep in the fall and well harrowed.

The prairie sod was part of a fifteen year old pasture field, broken and backset in the usual way.

The crop was very heavy in all cases, but with the exception of Preston on fallow, no grain lodged or was in any way injured. Preston was struck by rust a few days before being ripe, but as only the leaves were affected, the yield was not reduced.

The yield of all varieties was very satisfactory ; and the sample is an excellent one

Name of Variety.	Character of Soil.	Size of Plot.	Date of Ripening.	Number of Days maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.		Proportion Rusted.
		Acres			Inches		Inches		Bush.	Lbs.	
Preston...... ..	Fallow	5	Aug. 26	114	53	Medium	4	Bearded	54	54	A little rust on leaves.
White Russian..	"	½	" 26	114	55	Strong..	4½	Bald ...	49	40	
Red Fife	"	3⅕	" 25	113	53	" ..	4	"	49	..	"
"	Backsetting (native sod).	1½	" 27	117	56	Medium	4	"	48	..	
"	" (brome sod).	1	" 23	108	54	Strong..	4	" ...	45	50	
Preston....	" "	4	" 16	104	57	" ..	4¾	Bearded	45	45	
Red Fern.......	" "	1⅔	" 20	109	58	" ..	5	" ..	45	..	
Huron..........	Fallow	⅗	" 22	110	58	Medium	4	" ..	45	..	"
Stanley	Backsetting (brome sod).	4	" 16	102	57	Strong..	4½	Bald ...	40	45	
Wellman's Fife..	" "	4½	" 23	113	58	" ..	4½	"	39	20	
Red Fife	Stubble, fall ploughed..	1	" 24	114	57	" ..	4	"	36	20	
Percy	" " ..	6	" 20	109	55	" ..	4¼	"	36	18	

TEST OF BLUESTONE AS A PREVENTIVE OF SMUT IN WHEAT.

Sown on May 7, on 1-40th acre plots of fallowed land, by hoe-drill, at the rate of 1½ bushels per acre.

Seed.	Condition.	Treatment.	On 25 sq. feet.	
			Good heads.	Smutty heads.
Red Fife ...	Clean	1 lb. bluestone to 10 bush. wheat, dipped 1 minute.	943	11
" ...	"	" " " 1 hour...	949	..
" ...	Smutty . ..	" " " 5 minutes	873	8
" ...	"	Untreated	519	431

WHEAT—TEST OF SOWING SELECTED, WELL-CLEANED AND SMALL SEED.

In this test the selected seed used was hand-picked when ripe and before being cut in 1900, and thoroughly cleaned by mill ; the well-cleaned seed was our best Red Fife, run twice through the fanning-mill and was a large, plump sample. The small seed was what was taken out of the well-cleaned grain.

The seed was sown on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of 1½ bushels per acre, on May 7.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Red Fife, well-cleaned......	Aug. 28..	113	51	Strong....	3½	Bald.	5,100	67	..	61½
" selected	" 28..	110	51	"	3½	"	5,520	59	40	63
" small seed........	" 28..	114	52	"	3½	"	4,700	59	40	62

TEST OF FERTILIZERS.

Six plots of 1-40th acre each were sown with Red Fife Wheat ; five of which were treated with artificial manures, and the sixth used as a check-plot.

While the grain was growing no difference could be observed in the plots, and it will be noticed that the unfertilized plot yielded higher than three of the treated plots and nearly as high as the other two. It is, however, worthy of note that for the past two years, the plot treated with a mixture of the three manures, has given the highest yield.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Plot No. 1.—Nitrate of soda, 100 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high)..	May 15	Aug. 28	105	50	Strong..	$3\frac{1}{2}$	Bald....	5,920	61	20	62
Lot No. 2.—Nitrate of soda, 200 lbs. per acre (half sown when grain was 2 inches high, balance when 6 inches high)........	" 15	" 26	103	51	" ..	$3\frac{3}{4}$	"	5,480	58	40	62
Plot No. 3.—Superphosphate No. 1, 400 lbs. per acre (sown before grain and harrowed)............	" 15	" 27	104	51	" ..	$3\frac{1}{2}$	"	7,280	52	..	62
Plot No. 4.—Check-plot. Unfertilized....	" 15	" 28	105	50	" ..	$3\frac{1}{4}$	"	6,600	62	40	61
Plot No. 5.—Muriate of potash, 200 lbs. per acre (sown before grain and harrowed)...	" 15	" 26	103	51	" ..	$3\frac{1}{4}$	"	8,080	65	20	$62\frac{1}{2}$
Plot No. 6.—Superphosphate No. 1, 200 lbs. per acre ; muriate of potash, 100 lbs. per acre ; nitrate of soda, 100 lbs. per acre (half sown before grain and harrowed, balance when grain was 2 inches high)	" 15	" 27	104	52	" ..	$3\frac{1}{2}$	" .. .	8,080	65	20	$58\frac{1}{2}$

SPELTZ.

Sown on 1-20th and 3-20th acres of fallowed land by hoe-drill, at the rate of two bushels per acre.

The straw proved very weak and lodged badly, but from appearances while growing, would make good fodder if cut at the proper time.

Speltz is apparently well adapted to the country, and may be grown for the straw or grain for fodder ; the yield of the latter being very satisfactory.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			In.		In.		Lbs.	Bush.	Lbs.	
Speltz	Aug. 24	102	46	Weak	2	Bald	2,275	58	20	46½
"	" 26	104	47	"	1¾	"	2,475	52	4	46½

FALL WHEAT.

When visiting Southern Alberta in connection with Farmer's Institute work, in March last, many fields of fall wheat were noticed on the drive from Magrath to Pincher Creek, which have since given large yields of grain.

With the object of again testing fall wheat on the farm, seed of two varieties was secured and sown on August 5, on a particularly well prepared piece of fallowed land.

The seed was put down as deep as it was possible for the seeder to work, in the hope that the roots may be sufficiently far below the surface to save them from the effects of spring thaws and frosts, which have heretofore been fatal to fall wheat.

When the first killing frost came this fall, the wheat had attained a height of eight inches, and the leaves formed a thick mat entirely covering the ground.

While it is very gratifying to learn that fall wheat has been such a success in Alberta this year, it is not safe to conclude that it will always be so. Last spring was particularly free from thaws and frosts, and as soon as the growth started there was no set-back ; resulting in an excellent crop. In former tests made here with fall wheat, there has never been any difficulty in getting it safely through the hardest winter, and in 1899, which was perfectly free from spring thaws and frosts, it produced a very heavy crop of straw, but the grain was unfortunately struck by rust and completely destroyed. In all other trials, the alternate thawing and freezing from April 20 to May 25 has entirely killed the crop.

These thaws and frosts have hitherto made the growing of clovers very difficult on the Experimental Farm, and so long as the Territories are subject to them, it will be advisable not to risk too much on either fall wheat or clovers.

EXPERIMENTS WITH OATS.

Sixty-four varieties were tested on plots of 1-20th acre each ; fourteen of the same varieties were sown on plots of ½ to 11 acres, and Banner was used in the test of formalin as a preventive of smut.

The crop on the whole surpassed any previously grown on the farm.

With the exception of 8 acres of Banner oats sown on backsetting, and the plots in the rotation test, all the tests were made on land fallowed in 1900 and in good condition for crop.

The seed used was well cleaned by mill and was of excellent quality.

TEST OF VARIETIES.

Sown on fallow by hoe-drill, on May 9, at the rate of 2 bushels per acre.

The grain stood up well, and none of the plots sustained any injury from lodging, smut or rust, except Bonanza, which was, for some unknown reason, very smutty.

The rust mentioned in the following detailed result of the test was simply on the leaves and did no damage whatever.

OATS—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs	
Abundance	Aug. 18	101	51	Strong....	9½	Branching	5,320	147	2	41	
Thousand Dollar	" 18	101	51	"	9½	"	6,320	138	28	41¾	Slightly.
American Beauty	" 19	102	53	Medium..	10	"	5,640	137	2	39½	
Improved American	" 18	101	55	Strong....	10½	"	4,360	135	30	42	
Mennonite	" 19	102	53	"	10¼	"	5,260	134	4	39	
Lincoln	" 16	99	56	"	9½	"	2,100	130	20	41½	
Banner	" 21	104	60	"	10½	"	4,820	129	14	42	
American Triumph	" 16	99	56	"	10¼	"	4,000	129	14	40½	
Wide-awake	" 16	99	57	"	10¼	"	4,780	129	14	42½	
Danish Island	" 17	100	56	"	9½	"	4,960	128	8	41	
Early Golden Prolific	" 15	98	53	"	9½	"	4,720	127	2	40½	
Golden Beauty	" 18	101	56	"	8¾	"	2,920	126	16	40½	
Improved Ligowo	" 15	98	58	Weak	9	"	5,360	125	30	41	
Early Maine	" 16	99	55	Strong....	10¼	"	5,680	124	24	40	
Newmarket	" 17	100	58	Weak	9	"	3,980	124	24	43	Slightly.
Early Blossom	" 21	104	59	Strong....	13	Sided.....	6,900	121	26	41	
Wallis	" 20	103	60	Medium..	10½	Branching	4,900	121	6	40½	
Siberian	" 21	104	62	" ..	13½	Sided.....	5,720	120....		38½	Slightly.
Columbus	" 21	104	58	Weak	10	Branching	3,720	120......		38½	
Abyssinia	" 20	103	56	Strong ...	10½	"	4,960	119	14	41	
Early Gothland	" 19	102	57	"	10½	Sided.....	4,820	119	14	43	
Oderbruch	" 19	102	57	"	11	"	4,200	119	14	41	
Holstein Prolific	" 16	99	55	"	11	Branching	4,600	118	8	40½	
Bavarian	" 17	100	54	"	9½	"	4,580	117	22	37	
Goldfinder	" 26	109	53	Medium..	10½	Sided....	3,620	116	16	39½	
Buckbee's Illinois	" 17	100	55	Strong....	11	"	5,500	115	30	41½	
Joanette	" 24	107	48	"	10	Branching	5,600	114	24	38	
Prolific Black Tartarian.	" 22	105	57	"	10	Sided.....	3,640	114	24	38	
White Russian	" 19	102	57	"	8½	Branching	3,920	113	18	43½	
California Prolific Black	" 20	103	61	"	14	Sided.....	5,180	112	32	37½	
Early Archangel	" 23	96	53	Weak	10½	Branching	2,440	111	26	39	
Rosedale	" 20	103	57	Strong....	12	Sided.....	6,400	111	26	42½	Slightly.
Olive	" 22	105	56	"	9½	"	3,6·0	111	26	39½	
King	" 15	98	58	"	10	Branching	2,280	110.....		39	
Black Beauty	" 19	102	57	Weak	12	"	4,600	109	14	37	
Kendal	" 25	108	40	Strong....	11½	"	3,160	108	28	40	
Golden Giant	" 23	106	57	"	14	Sided.....	2,100	108	28	35	
Pense	" 23	106	52	"	13¼	"	4,820	107	22	39½	
Holland	" 21	104	62	"	15	"	4,840	105	10	35	
New Zealand	" 25	108	[illegible]	"	13	"	4,200	105	10	3·½	Slightly.
Pioneer	" 23	106	[illegible]	"	11½	Branching	4,180	104	24	38½	
Flying Scotchman	" 12	95	[illegible]	"	11¼	"	5,200	103	18	41	
Milford	" 23	106	58	"	14	Sided.....	3,600	102	32	38½	
Cromwell	" 22	105	61	"	13	"	3,560	102	12	40	
Hazlett's Seizure	" 12	95	54	Weak	12¾	Branching	3,460	101	26	42	
Golden Tartarian	" 20	103	59	Strong....	12½	Sided.....	2,660	99	14	36½	Slightly.
Tartar King	" 22	105	58	"	13	"	4,060	93	28	42½	
Sensation	" 20	103	61	"	9½	Branching	4.000	97	22	42½	
Waverley	" 21	104	54	"	11¼	"	4,460	97	2	41¾	
White Schonen	" 14	97	53	Weak	11	"	4,160	97	2	43	
Salines	" 22	105	57	Strong....	11	"	4,480	96	16	37½	
Cream Egyptian	" 11	94	58	"	12	"	2,840	96	16	44	
Miller	" 15	98	63	"	13	"	4,560	95	10	39	
Russell	" 19	102	58	"	12	"	4,360	95	10	40	Slightly.
Scotch Potato	" 23	106	63	" .	11¾	"	5,620	94	24	37½	
Brandon	" 15	98	65	"	13	"	5,680	92	32	38½	
White Giant	" 15	98	57	"	10½	"	3,880	91	26	39	
Master	" 23	106	58	"	12	Sided.....	5,040	90	20	40	Slightly.
Black Mesdag	" 13	96	55	"	12	Branching	3,840	87	2	38¾	
Irish Victor	" 22	105	54	Medium..	10½	"	3,240	87	2	40	
Longhoughton	" 26	109	55	Strong....	11½	"	4,080	81	6	39	Slightly and smutty.
Oxford	" 21	104	58	"	10	"	4,080	80.....		41	
Bonanza	" 12	95	55	Medium..	11	"	4,260	72	32	45	Very smutty

Scenes on Experimental Farm, Indian Head, N.W.T.

1. Fruiting branch of plum tree.
2. Indian corn in 1901.
3. Farm herd of cattle.
4. Wheat in stook, crop of 1901.

OATS—FOURTEEN VARIETIES SOWN ON PLOTS OF ½ TO 11 ACRES.

Name of Variety.	Size of Plot.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of head.	Kind of Head.	Yield per Acre.	
	Acres.				In.		In.		Bush.	Lbs.
Abundance, on fallow	5	May 11.	Aug. 22.	103	56	Strong....	10	Branching	124	20
Banner "	11½	" 11.	" 19.	100	59	"	11½	" ..	117	..
Tartar King "	3¼	" 8.	" 18.	102	61	" ...	10¾	Sided.....	104	10
Goldfinder "	1¼	" 8.	" 28.	112	62	Medium. .	12	Branching	104	..
New Zealand "	1½	" 15.	" 27.	104	58	Weak	12½	Sided....	100	..
Bavarian "	4½	" 9.	" 16.	99	61	Strong....	10	Branching	99	4
Wide-awake "	6	" 8.	" 15.	99	59	"	10½	" ..	96	..
Waverley "	3½	" 8.	" 19.	103	61	Medium. .	10	" ..	94	..
Black Beauty "	¾	" 15.	" 19.	96	56	Weak ...	10½	" ..	93	..
Thousand Dollar, on fallow......	1	" 15.	" 23.	100	56	Strong....	9	" ..	92	4
Banner, on prairie sod backsetting.	8	" 7.	" 12.	97	58	"	11	" ..	91	30
Lincoln, on fallow.	½	" 15.	" 22.	99	57	"	11	" ..	91	2
Improved Ligowo, on fallow.....	5	" 8.	" 17.	101	62	Weak ...	12	" ..	83	..
Early Archangel "	½	" 15.	" 22.	99	53	Strong....	9½	" ..	76	14

TEST OF FORMALIN AS A PREVENTIVE OF SMUT IN OATS.

Sown on May 9, on 1-40th acre plots of fallowed land, by hoe-drill, at the rate of 2 bushels per acre.

Seed.	Condition.	Treatment.	On 25 sq. feet.	
			Good Heads.	Smutty Heads.
Banner.......	Clean.........	6 oz. formalin to 10 galls. water, soaked 1 hour..	897	0
"	"	" " " 20 mins.	860	0
"	"	" " " 5 " ..	911	3
"	"	Untreated	870	23

COMPARATIVE TEST OF SELECTED AND WELL SCREENED OATS FOR SEED.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Banner, selected	Aug.	21	104	60	Strong..	10½	Branching	4,760	130	20	41½
" well cleaned...........	"	21	104	61	" ..	11	" ..	5,720	122	12	42
" small seed......	"	19	102	60	" ..	10½	" ..	5,540	120	20	44¾

The seed sown in the above test was procured in the same manner as that used in a similar test with wheat. Sown on May 9, on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of one and one-half bushels per acre.

EXPERIMENTS WITH BARLEY.

Thirty varieties of 6-rowed and twenty-two varieties of 2-rowed Barley were tested on uniform plots of 1-20th acre each ; ten of the same varieties were sown on plots of ¼ to 5 acres, and Royal was used in the test of formalin as a preventive of smut.

The crop on the whole, was satisfactory, and some very large yields were obtained on the uniform test plots.

There was, unfortunately, considerable smut in some of the varieties, although all the seed had been treated with formalin.

TEST OF VARIETIES.

Thirty varieties of 6-rowed and twenty-two varieties of 2-rowed Barley were sown on May 14, on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of 2 bushels per acre. All germinated evenly and well.

White and Black Hulless lodged badly, but all the other varieties were erect when cut.

SIX-ROWED SORTS.

Name of Variety.	Date of Ripening.		No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Proportion Smutty.
				In.		In.	Lbs.	Bush	Lbs.	Lbs.	
Odessa	Aug.	15	93	43	Weak	3	4,000	68	36	50	
Mensury	"	14	92	46	Strong	3¼	3,780	67	4	49½	
Claude	"	11	89	41	"	3	3,300	66	12	50	
Royal	"	12	90	41	"	3	3,140	63	16	52	
Trooper	"	11	89	43	"	3	3,360	59	28	51½	
Petschora	"	10	88	37	"	3¼	3,380	59	8	49	
Brome	"	13	91	41	Medium	3	4,960	58	16	52	
Blue Long-head	"	21	99	38	Strong	3	2,320	57	4	48	
Mansfield	"	14	92	47	"	3	3,570	57	4	50	Slightly smutty.
Empire	"	15	93	46	Medium	3	3,900	56	32	50½	
Summit	"	21	99	43	Strong	3	4,200	56	12	52	
Nugent	"	22	100	44	"	3	4,490	55	40	52	"
Pioneer	"	20	98	47	"	3	2,920	54	8	53½	
Common	"	11	89	41	Medium	3	3,900	53	36	51	
Garfield	"	14	92	43	Strong	3¼	3,800	53	16	51½	
Oderbruch	"	7	85	44	Weak	3½	2,100	53	16	50	
Rennie's Improved	"	9	87	41	Strong	3	3,320	52	24	50½	
Stella	"	13	91	39	"	2¼	4,340	51	12	51½	
Baxter	"	9	87	39	"	2½	3,700	50	..	51	A little smut.
Yale	"	14	92	45	"	2¾	4,570	48	36	49	
Champion	"	7	85	46	"	3¾	3,620	47	4	49	
Surprise	"	14	92	40	"	3	3,650	46	12	52½	"
Albert	"	10	88	36	"	2¼	3,580	45	40	52½	
Vanguard	"	9	87	40	"	3	2,760	45	40	50	"
Black Hulless	"	7	85	34	Medium	2½	3,480	45	40	63½	
Argyle	"	10	88	40	Strong	3	3,960	44	8	48½	
Success	"	7	85	39	"	3¼	2,980	41	12	49	
Phoenix	"	9	87	38	"	2¼	3,900	40	..	52	Smutty.
White Hulless	"	6	84	36	Weak	3¼	3.730	37	4	57	
Excelsior	"	5	83	38	Strong	4	2,780	35	..	49½	

TWO-ROWED SORTS.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.	Proportion Smutty.
			In.		In.	Lbs.	Bush.	Lbs.	Lbs.	
Standwell.............	Aug. 23..	101	45	Strong....	3	3,020	67	44	52	Slightly smutty
Sidney.................	" 9..	87	44	" ...	3¾	6,100	61	32	53½	
Bolton.................	" 14..	92	52	Medium..	4¼	4,900	59	28	53	"
Kirby..................	" 14..	92	47	" ..	3¼	4,420	59	8	51¾	
Leslie.................	" 10..	88	45	" ..	3¼	3,910	58	36	53½	
Nepean......	" 13..	91	52	Strong....	3¾	3,430	58	16	50½	
French Chevalier.......	" 24..	102	39	" ..	4½	3,740	57	44	51¾	
Harvey...	" 5..	83	48	" ...	4¼	4,620	57	24	53½	
Jarvis.................	" 7..	85	49	" ...	5	5,270	57	4	51¾	
Danish Chevalier..	" 24..	102	41	Weak	4¾	3,920	57	4	51	
Prize Prolific...........	" 24..	102	42	"	5	2,800	56	32	52	
Invincible.....	" 21..	99	47	Strong....	3¾	3,600	55	40	53½	
Kinver Chevalier.......	" 25..	103	38	Weak	4	2,720	55	40	51	
Newton.......	" 23..	101	43	Strong....	4¼	4,300	55	20	53	"
Logan..................	" 11..	89	50	" ...	3½	6,470	54	28	53½	"
Clifford................	" 6..	84	47	" ...	3½	4,480	54	8	53	"
Gordon	" 10..	88	51	" ...	3	4,980	52	24	53	
Canadian Thorpe.......	" 22..	100	44	" ...	3½	3,580	50	40	53	
Fulton.........	" 10..	88	48	" ...	3	3,760	50	40	53	
Victor....	" 14..	92	44	" ...	4	3,580	47	4	52½	
Dunham	" 8..	86	43	" ...	3	3,720	45	20	51½	A little smut.
Beaver..	" 11..	89	40	" ...	4¼	2,920	36	32	49	

BARLEY—TEST OF VARIETIES ON PLOTS OF ¼ TO 5 ACRES.

Nine varieties were sown on fallow and one of the same varieties on Brome backsetting.

The fallow was a field of 24 acres ploughed 7 inches deep in May, 1900, and cultivated four times during the season.

The crop of straw was enormous, and Odessa lodged badly over the entire 5 acres; while others went down in spots.

Rennie's Improved and Common were affected by smut, which considerably decreased the yield of these two varieties.

Name of Variety.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	
	Acres.				In.		In.		Bush.	Lbs.
Sidney, on fallow.........	5	May 14..	Aug. 15..	92	47	Medium..	4	2-rowed...	60	10
Mensury, on fallow.	5	" 14..	" 10..	87	47	Strong....	2¾	6 " ..	59	40
Odessa, on fallow.........	5	" 13..	" 11..	89	43	Weak	3	6 " ..	58	40
Sidney, on Brome backsetting..........	4	" 16..	" 15..	90	46	Medium..	3¾	2 " ..	51	..
Invincible, on fallow.....	½	" 15..	" 22..	99	46	Strong....	3½	2 " ..	49	32
Rennie's Improved, on fallow	5	" 14..	" 8..	85	47	"	2¼	6 " ..	49	20
Trooper, on fallow........	3	" 13..	" 7..	85	44	Medium..	2¾	6 " ..	48	16
Standwell, on fallow......	½	" 15..	" 22..	99	43	"	3	2 " ..	48	16
Common, on fallow......	1	" 14..	" 10..	87	43	"	2¾	6 " ..	48	..
Canadian Thorpe, on fallow	¼	" 15..	" 18..	95	44	Strong....	3¼	2 " ..	44	..

TEST OF FORMALIN AS A PREVENTIVE OF SMUT IN BARLEY.

Sown on May 14, on 1-20th acre plots of fallowed land, by hoe-drill, at the rate of 2 bushels per acre.

Seed.	Condition.	Treatment.	On 25 sq. feet. Good Heads.	On 25 sq. feet. Smutty Heads.
Royal	Smutty	6 oz. formalin to 10 galls. water, soaked 1 hour	872	3
"	"	6 oz. formalin to 10 galls. water, soaked 20 mins.	783	20
"	"	6 oz. formalin to 10 galls. water, soaked 5 mins.	760	36
"	"	Untreated	630	241

Wheat Crop and Average Yield.

Variety.	Cultivation.	Acres.	Yield per Acre.	Total Yield.
Red Fife	Brome backsetting	1	45-50	45-50 bush.
"	Prairie sod, backset	$1\frac{1}{2}$	48	72 "
"	Stubble, fall ploughed	10	36-20	362 "
"	Fallow	$3\frac{1}{5}$	49	157 "
"	Rotation test	$4\frac{1}{2}$	....	168-32 "
Preston	Fallow	5	54-54	274-30 "
"	Brome backsetting	4	45-45	183 "
Stanley	"	4	40-45	163 "
Wellman's Fife	Prairie sod, backset	$4\frac{1}{2}$	39-20	177 "
Percy	Stubble, fall ploughed	$6\frac{3}{4}$	36-18	245 "
Huron	Fallow	$\frac{3}{5}$	45	27 "
White Russian	"	$\frac{1}{2}$	49-40	24-50 "
Red Fern	Brome backsetting	$1\frac{2}{5}$	45	75 "
		$47\frac{13}{60}$		1974-42

Or an average of 41 bushels 40 lbs per acre.

Oat Crop and Average Yield.

Variety.	Cultivation.	Acres.	Yield per Acre.	Total Yield.
Abundance	Fallow	5	124-20	623 bush.
Banner	"	$11\frac{1}{9}$	117	1300 "
"	Prairie sod, backset	8	91-30	735 "
Wide-awake	Fallow	6	96	576 "
Bavarian	"	$4\frac{1}{2}$	99-4	446 "
Waverley	"	$3\frac{1}{2}$	94	329 "
Tartar King	"	$3\frac{1}{4}$	104-10	339 "
Gold Finder	"	$1\frac{1}{4}$	104	130 "
New Zealand	"	$1\frac{1}{5}$	100	120 "
Thousand Dollar	"	1	92-4	92-4 "
Early Archangel	"	$\frac{1}{2}$	76-14	38-7 "
Lincoln	"	$\frac{1}{2}$	91-12	45-18 "
Black Beauty	"	$\frac{3}{4}$	93	69-24 "
Improved Ligowo	"	5	83	416 "
		$51\frac{5}{9}$		5259-19

An average of 101 bushels 15 lbs per acre.

BARLEY CROP AND AVERAGE YIELD.

Variety.	Cultivation.	Acres.	Yield per Acre.	Total Yield.
Odessa	Fallow	5	58-40	294-8 bush.
Mensury	"	5	59-40	299-8 "
Rennie's Improved	"	5	49-20	247-4 "
Sidney	"	5	60-10	301 "
Trooper	"	3	48-16	145 "
Common	"	1	48	48 "
Standwell	"	½	48-16	24-8 "
Invincible	"	½	49-32	24-40 "
Sidney	Brome sod, backset	4	51	204 "
		29½		1587-20

An average of 53 bushels 30 lbs per acre.

EXPERIMENTS WITH PEASE.

Fifty-seven varieties of pease were sown on 1-20th acre plots of fallowed land, on May 15, by hoe-drill, at the rate of 2 bushels small, 2½ bushels medium and 3½ bushels large pease per acre.

The growth was slow at first, but after the rains came it was abnormally heavy, and some excellent yields of very fine pease were secured.

PEASE—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				Inches.	Inches.		Bush.	Lbs.	Lbs
Oddfellow	Sept. 5	113	Strong	47	3	Large	66	..	65½
Pride	" 7	115	"	70	3	"	60	20	64
German White	Aug. 30	107	"	75	3¼	"	60	..	63½
Paragon	Sept. 10	118	"	49	2	Medium	59	40	64
Daniel O'Rourke	Aug. 30	107	"	92	3	Small	59	..	64½
Gregory	Sept. 5	113	"	49	3	Medium	58	40	63
White Wonder	Aug. 27	104	Weak	28	2¾	"	57	..	63¾
King	Sept. 1	109	Strong	79	3	Large	56	..	63
Fenton	" 5	113	"	64	3¼	"	54	40	62½
Crown	" 6	114	Medium	44	2½	Small	54	20	64
Agnes	" 4	112	Strong	70	3	Large	53	40	62½
Golden Vine	" 7	115	"	50	2¼	Small	53	20	63¾
Trilby	" 8	116	"	52	3	Large	53	..	62½
Early Britain	" 8	116	"	50	2½	"	53	..	60
Lanark	" 5	113	"	48	3	"	52	20	63
Elephant Blue	" 6	114	"	38	2	Medium	52	..	62½
Kent	" 8	116	"	72	3¼	Large	52	..	63½
Macoun	" 11	119	"	52	2¼	"	51	20	62½
Large White Marrowfat	" 9	117	"	70	3	"	51	20	63½
Alma	" 8	116	"	56	2¼	Medium	51	20	62½
Bruce	" 10	118	"	60	2¼	Large	51	20	62½
New Potter	" 8	116	"	57	3	"	51	..	61½
Nelson	" 9	117	"	50	2¾	Medium	51	..	65
Carleton	" 8	116	"	50	2½	"	50	40	62½
Prussian Blue	" 3	111	"	64	3	"	50	40	64½
Cooper	" 7	115	"	67	2½	"	50	40	63
Arthur	" 5	113	"	42	2¾	Large	50	20	64½
Black-eyed Marrowfat	" 6	114	"	48	3¾	"	50	20	63½
Elliot	" 10	118	"	48	2½	"	50	20	61½
Mummy	" 2	110	"	67	3	Medium	50	..	62

PEASE—TEST OF VARIETIES—*Concluded.*

Name of Variety.	Date of Ripening.	Number of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				Inches.	Inches.		Bush.	Lbs.	Lbs
Chancellor	Aug. 30..	107	Weak	55	2	Small	50	..	65
French Canner	Sept. 5..	113	Strong....	51	3	"	49	40	64
Prince	" 3..	111	"	61	3	Large	49	40	63
Canadian Beauty	" 8..	116	"	62	2½	"	49	40	64
Prince Albert	" 5..	113	"	52	2	"	49	20	63½
Dover	" 8..	116	"	48	2¼	"	49	..	61½
Centennial	" 5..	113	"	52	2½	Small	49	..	63
Perth	" 6..	114	"	68	3	Large	48	40	62¾
English Grey	" 4 .	112	"	42	3	"	48	20	62½
Archer	" 8..	116	"	48	2	Medium..	48	20	63½
Picton	" 1..	109	"	63	3	Large	48	..	64
Creeper	" 6..	114	Weak	55	2	Small	47	40	64
Fergus	" 8..	116	Strong....	48	2¼	Large	47	..	63
Vincent	" 8..	116	"	48	2¼	"	47	..	62
Duke	" 8..	116	"	48	2½	"	46	40	64
Pearl	" 11..	119	"	54	2¼	"	46	20	62½
Harrison's Glory	" 10..	118	"	49	3	"	46	..	64
Bright	" 12..	120	"	60	3	"	46	..	62
Victoria	" 10..	118	"	49	3	"	45	20	63
Mackay	" 11..	119	"	52	2½	"	45	20	63
Wisconsin Blue	" 5..	113	"	38	2½	Small	44	20	63
Bedford	" 8..	116	"	42	2	Medium..	43	20	62½
Herald	" 5..	113	"	56	2	" ..	41	20	63
Multiplier	" 5..	113	"	58	2	Small	40	40	63
Elder	" 10..	118	"	48	2½	Medium..	40	20	62½
Chelsea	" 5..	113	"	49	2	Small	39	20	65½
Grass Pea	" 12..	120	"	53	1	"	36	..	..

INDIAN CORN.

TEST OF VARIETIES.

Thirty-four varieties of Indian Corn were sown on May 22, in rows 36 inches apart, by grain-drill ; and for comparison, planted by hand in hills three feet apart each way, on the same date.

Both plots were cut for ensilage on September 2. The yield was computed from the weight of corn on two rows, each 66 feet long.

The land used for the test had been fallowed in 1900, and in the fall of that year twenty loads per acre of well-rotted manure was spread evenly over the ground. Before seeding in the spring this was gang-ploughed in, three inches deep, and the plots were well harrowed.

Before and after the corn came up the weeder was used, and until it was too high to permit the working of a horse, a scruffler was run at short intervals. No weeds were allowed to appear.

When cut for ensilage, on September 7, all varieties were well advanced, and the quality and quantity of the fodder is the best we have ever been able to secure here.

Name of Variety.	Character of Growth.	Height.	Condition when Cut.	Weight per Acre grown in rows.		Weight per Acre grown in hills.	
		Inches.		Tons.	Lbs.	Tons.	Lbs.
Early Mastodon	Very strong	138	Late milk	26	1,724	13	1,388
Pride of the North	"	101	"	26	800	21	32
Giant Prolific Ensilage	"	103	Tassel	25	1,480	16	1,792
Mammoth Cuban	"	117	Early milk.	24	388	19	1,600
Cloud's Early Yellow	"	107	Glazed	24	388	18	168
Salzer's All Gold	"	127	Late milk	24	180	20	1,920
Evergreen Sugar	"	113	"	23	1,784	21	264
Pearce's Prolific	Strong	96	"	23	1,520	17	848
Salzer's Superior Fodder	Very strong	133	Early milk	23	860	17	848
Selected Leaming	"	102	Late milk	23	200	22	880
Country Gentleman	Strong	94	"	22	1,850	13	400
Angel of Midnight	"	99	"	22	1,408	18	1,456
Canada White Flint	Medium	98	Early milk	22	200	17	848
Red Cob Ensilage	Very strong	100	"	22	180	16	1,792
Longfellow	"	131	"	21	1,560	21	240
Early Butler	"	124	Late milk	21	900	18	168
North Dakota White	Medium	92	Glazed	21	504	14	312
Mammoth Eight-rowed Flint	"	95	Early milk	20	1,844	14	776
White Cap Yellow Dent	Very strong	114	"	20	920	16	1,264
Thoroughbred White Flint	"	94	Tassel	20	524	19	280
Compton's Early	Strong	99	Late milk	19	1,996	12	1,872
Yellow Six-weeks	Weak	77	Glazed	19	1,864	11	440
Champion White Pearl	Strong	95	Early milk	19	1,600	16	1,752
Very Early August	Weak	83	Glazed	19	544	12	288
Extra Early Huron Dent	Very strong	117	"	19	544	15	1,416
North Dakota Yellow	Medium	98	Late milk	17	1,738	14	284
Ruby Mexican	"	103	"	17	640	11	1,552
Early Yellow Long-eared	Very strong	116	"	17	452	15	1,914
Kendall's Early Giant	Medium	82	"	17	188	15	1,680
Sanford	Strong	96	Early milk	16	500	12	816
King of the Earliest	Medium	105	Late milk	16	200	17	320
Extra Early Szekely	Weak	92	"	13	1,324	9	1,800
Mitchell's Extra Early	"	75	Glazed	12	1,244	15	1,680
Salzer's Earliest Ripe	"	92	Late milk	12	1,080	11	704

INDIAN CORN.—Test of seeding at different distances sown in drills by grain seeder on May 22. Cut September 2. Cultivation of land the same as for preceding test.

Name of Variety.	Distance between rows.	Character of Growth.	Height.	Weight per Acre grown in rows.	
	Inches.		Inches.	Tons.	Lbs.
Champion White Pearl	21	Strong	116	21	300
"	28	"	116	12	842
"	35	"	116	18	1,968
"	42	"	117	17	686
Longfellow	21	"	113	26	640
"	28	"	125	23	1,940
"	35	Very strong	130	24	251
"	42	"	137	21	1,616
Selected Leaming	21	"	123	25	8
"	28	"	119	24	645
"	35	"	121	21	827
"	42	"	129	19	1,198

ROTATION OF CROPS.

The plan inaugurated in 1899 for a rotation of crops was followed out this year in a satisfactory manner.

No.	1899.	1900.	1901.
1	Wheat	Oats	Soja Beans.
2	Wheat	Wheat	Pease.
3	Wheat	Oats	Tares.
4	Wheat	Wheat	Red Clover.
5	Wheat	Barley	Alsike and Lucerne.
6	Pease	Wheat	Wheat.
7	Tares	Wheat	Oats.
8	Soja Beans	Wheat	Oats
9	Red Clover	Wheat	Wheat.
10	Alsike and Lucerne	Wheat	Barley.
11	Rape	Wheat	Summer-fallow.
12	Wheat	Wheat	Summer-fallow.
13	Wheat	Oats	Summer-fallow.
14	Wheat	Barley	Summer-fallow.
15	Wheat	Wheat	Oats.
16	Wheat	Barley	Oats.
17	Oats	Soja Beans	Wheat.
18	Wheat	Pease	Wheat.
19	Oats	Tares	Wheat.
20	Wheat	Red Clover	Wheat.
21	Barley	Alsike and Lucerne	Wheat.
22	Rye	Summer-fallow	Wheat.

Results obtained in 1901. Soil, Clay Loam.

	Name of Variety.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	
						In.		In.		Bush.	Lbs.
1	Soja Beans	½ acre	May 22		...	34	Ploughed under Aug. 21.				
2	Pease	"	" 16		....	60	" July 26.				
3	Tares	"	" 16		....	28	" " 10.				
4	Red Clover	"	" 16		....	16	" Sept. 3.				
5	Clover, Alsike and Lucerne	"	" 16		....	30	" " 3.				
6	Wheat, Red Fife	"	" 6	Aug. 26	112	54	Strong	3¾	Bald	38	52
7	Oats, Banner	"	" 6	" 15	101	51	"	10	Branch	97	32
8	Oats, Banner	"	" 6	" 15	101	45	"	10	"	91	8
9	Wheat, Red Fife	"	" 6	" 26	112	54	"	4	Bald	38	..
10	Barley, Sidney	"	" 6	" 15	101	40	"	3	2-rowed.	50	36
11	Summer Fallow	"		Ploughed 7 inches deep on June 5, and cultivated 4 times during summer.							
12	" "	"			"				"		
13	" "	"			"				"		
14	" "	"			"				"		
15	Oats, Banner	"	May 6	Aug. 15	101	48	Strong	10½	Branch	80	26
16	Oats, Banner	"	May 6	" 15	101	50	"	10½	"	98	8
17	Wheat, Red Fife	"	" 6	" 26	112	54	"	4	Bald	43	44
18	" "	"	" 6	" 26	112	50	"	4	"	43	18
19	" "	"	" 6	" 26	112	51	"	3¾	"	43	2
20	" "	"	" 6	" 26	112	53	"	4	"	42	16
21	" "	"	" 6	" 26	112	52	"	4	"	43	12
22	" "	"	" 6	" 25	111	51	"	4	"	44	40

SUMMARY OF RESULTS FOR TWO YEARS.

Plot	Variety.	Yield per Acre.		Variety.	Yield per Acre.	
	1900.	Bush.	Lbs.	1901.	Bush.	Lbs.
1	Oats, Banner	11	2	Soja Beans, ploughed under Aug. 21		
2	Wheat, Red Fife	4	20	Pease, " " July 26		
3	Oats, Banner	11		Tares, " " 10		
4	Wheat, Red Fife	5		Red Clover, " " Sept. 3		
5	Barley, Canadian Thorpe	9	44	Clover, Alsike and Lucerne. 5		
6	Wheat, Red Fife.	16	50	Wheat, Red Fife	38	52
7	Wheat. Red Fife	19	30	Oats, Banner	97	32
8	Wheat, Red Fife	18	20	Oats, Banner	91	8
9	Wheat, Red Fife	11	20	Wheat, Red Fife	38	
10	Wheat, Red Fife	8	20	Barley, Sidney	50	36
11	Wheat, Red Fife	10	40	Summer Fallow, ploughed June 5		
12	Wheat, Red Fife	7	40	Summer Fallow, "		
13	Oats, Banner	9	14	Summer Fallow, "		
14	Barley, Canadian Thorpe	4	32	Summer Fallow, "		
15	Wheat, Red Fife	4	30	Oats, Banner	80	26
16	Barley, Canadian Thorpe	9	4	Oats, Banner	98	8
17	Soja Beans (Ploughed under)	Aug.	3	Wheat, Red Fife.	43	44
18	Pease, Golden Vine (Ploughed under)	July	28	Wheat, Red Fife	43	18
19	Tares (Ploughed under)	"		Wheat, Red Fife	43	2
20	Clover, Common Red (Ploughed under)	Sept.	10	Wheat, Red Fife	42	16
21	Clover, Alsike and Lucerne (Ploughed under)	"		Wheat, Red Fife	43	12
22	Summer Fallow (Ploughed under)			Wheat, Red Fife	44	40

EXPERIMENTS WITH FLAX.

Sowing different quantities of seed per aere and at different dates. Soil, Clay Loam, summer-fallowed. Sown by hoe-drill.

Name of Variety.	Size of Plot.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
	Acre.				Inches.	Lbs.	Bush.	Lbs.	Lbs.
40 lbs. per acre	$\frac{1}{20}$	May 15	Aug. 15	92	30	2,480	18	12	56
80 "	$\frac{1}{20}$	" 15	" 15	92	30	2,680	17	38	$55\frac{1}{2}$
40 "	$\frac{1}{20}$	" 22	" 20	90	30	2,960	19	36	56
80 "	$\frac{1}{20}$	" 22	" 20	90	30	3,380	21	36	$55\frac{3}{4}$
40 "	$\frac{1}{20}$	" 29	" 20	83	30	2,520	21	4	56
80 "	$\frac{1}{20}$	" 29	" 20	83	30	2,720	22	40	$55\frac{3}{4}$

On account of the lateness of the season only three seedings were practieable.

Experiments with white flax.

The experiment with White Flax, kindly sent for trial by Mr. Alfred Boyd, Toronto, Ontario, was continued this year, and although the season was very favourable for ordinary flax, the white variety was a complete failure. The straw did not grow over 6 inches high, and very little seed formed.

EXPERIMENTS WITH MILLETS.

Seven varieties were sown on May 23, on 1-20th aere plots of land fall-ploughed and manured.

Cut for feed on September 5.

Variety.	Length of Straw.	Length of Head.	Condition when cut.	Yield per Acre.
	Inches.	Inches.		Tons. Lbs.
Italian	41		Not in head	15 1,218
Cat-tail	40		"	15 492
Hungarian	44	$4\frac{1}{2}$	Headed	12 1,410
Japanese	47		Not in head	12 175
White Round French	56	9	Headed	9 690
German	33		Not in head	9 510
Pearl	25		"	7 520

EXPERIMENTS WITH RAPE.

Three varieties were sown on May 23, on 1-20th acre plots of fall-ploughing, manured.

Cut for feed on September 14.

Variety.	Length.	Yield per Acre.
	Inches.	Tons. Lbs.
Dwarf Essex	62	41 1,870
Broad Leafed	55	41 1,190
Dwarf Victoria	53	31 1,450

EXPERIMENTS WITH CANARY GRASS.

(*Phalaris canariensis*).

Sown May 15, on 1-20th acre plot of fallowed land, cut August 26; time of mature, 103 days.

Straw, strong ; 46 inches long.

Head, $1\frac{3}{4}$ inches long.

Weight of straw per acre, 3,060 lbs.

Yield per acre, 25 bushels 30 lbs.

EXPERIMENT WITH SUNFLOWERS.

Mammoth Russian was sown on May 22 ; frozen September 17 ; height, 12 feet. Very few heads had matured before frost came, and the greater portion of the crop was lost.

EXPERIMENT WITH SPRING RYE.

Sown on May 14, on 1-40 acre lot of fallowed land.

Ripe August 22 ; time to mature, 100 days.

Straw, strong; 51 inches long.

Length of head, 4 inches. Yield per acre, 52 bushels and 8 pounds.

EXPERIMENT WITH SOJA BEANS.

Sown on May 22, on 1-20th acre plots of land manured and fall-ploughed. Cut September 14. No pods formed.

Variety.	Distance between Rows.	Height.	Yield per Acre (Green).
	Inches.	Inches.	Tons. Lbs.
Soja Beans	21	38	7 1,550
"	28	39	6 936
"	35	33	6 1,605

EXPERIMENTS WITH HORSE BEANS.

Sown on May 22, on 1-20th acre plots of land manured and fall-ploughed. Cut September 14. The beans fully matured.

Variety.	Distance between Rows.	Length of Pod.	Height.	Yield per Acre (Green).
	Inches.	Inches.	Inches.	Tons. Lbs.
English Horse Beans	21	3	50	11 1,325
"	28	3	50	11 344
"	35	3	56	11 1,582

EXPERIMENT WITH TURKESTAN ALFALFA.

This seed was sown in the spring of 1900, in one of the garden-plots, and came through the winter in perfect condition.

Requiring the ground for Apple-trees, and not deeming the test a satisfactory one on account of the large amount of protection afforded the crop by the hedges, it was ploughed under in May. In spite, however, of the ploughing and other cultivation, many of the roots continued to grow during the summer, and produced a heavy crop of coarse feed, which the stock did not care for.

HAY CROP.

The crop of Hay secured from both Brome grass and Western Rye grass was very satisfactory.

On recent seedings the crop was above the average and old fields produced a fairly good yield. Part of the fields of Brome-grass and Western Rye-grass where snow had accumulated, gave large returns and brought up the average of some fields, portions of which were exposed to winds, and were consequently bare of snow during the whole winter.

A considerable acreage of both these grasses was left and cut for seed, which has been secured in good condition, free from foul seed of any sort.

One and three-quarter acres, cut for seed, August 3.

BROME GRASS (*Bromus inermis*).

1 acre, first crop, cut July 30 ; yield, 4 tons 1,980 pounds per acre.
10 acres, first crop, cut July 30 ; yield, 1 ton 1,780 pounds per acre.
6 acres, third crop, cut July 9 ; yield, 1 ton 435 pounds per acre.
14 acres, second crop, cut for seed July 31.

WESTERN RYE GRASS (*Agropyrum tenerum*).

Two and three-fifth acres, first crop, cut July 11 ; yield, 4 tons 500 pounds per acre.

Three and a half acres, fifth crop, cut July 23. (Manured spring 1901). Yield, 4 tons per acre.

One and three-quarter acres, cut for seed, August 3.

MIXTURE.

Five acres, mixed Brome and Western Rye grass, first crop, cut July 23 ; yield, 2 tons 360 pounds per acre.

NEW SEEDINGS (1901).

Fifteen and three-quarter acres Brome grass, sown June 19.
Eleven and three-quarter acres Western Rye grass, sown June 18.
One and one-quarter acres Western Rye grass, sown May 25.

SEEDING AND CULTIVATION OF BROME GRASS.

For information regarding the seeding and cultivation of Brome grass the following is quoted from the report of 1896 :—

'This grass is better sown alone ; at least it should not be sown with a grain crop. The grain takes too much moisture from the young grass-plants, only the most vigorous of which will survive the dry weather in September ; whereas, if sown alone all the plants have an equal chance.

'It is advisable to sow the seed on land that does not blow. Summer-fallow would be the best preparation, but on account of its liability to drift it is not safe in many parts of the Territories to use this kind of land. Stubble-land ploughed three or four inches deep in April or May, and well harrowed after the seed is sown is found to be quite safe from winds, as the stubble harrowed to the top prevents all drifting.

'Ten or twelve pounds of seed is required per acre. More seed will give a better crop the first year, but less afterwards, as the roots thicken up each year, and in three or four years this grass makes better pasture than hay.

'The seed being light, long and thin, seeding by hand is the only practicable method unless seeders constructed for the purpose are available. To seed properly a calm day should be chosen, so that all parts of the land may be evenly sown.

'While the plants are young, weeds are sure to make great headway, and it is necessary to keep them at least from going to seed. The quickest way to accomplish this is to go over the field with a mower, cutting just above the grass plants. If this operation has to be repeated it will be necessary to cut the tops of the grass, but this will not injure the plants, in fact it is an advantage in the way of giving the roots a firmer hold.

'The first crop of hay can be cut the next year after seeding, and will, in ordinary years, be ready early in July. Twenty days after being ready to cut for hay it will be fit to cut for seed if so desired.

'On this farm it has always been cut in first bloom for hay, and twenty days from this time it is considered in proper condition to cut for seed.

'In cutting for seed, a binder is used and the grass is cut, tied and stooked the same as wheat or other grain. In a week or ten days after cutting it is ready to thresh or store away.

'For threshing small quantities, the old-fashioned flail is suitable, but for large lots a threshing machine should be used on which the wind has been shut off as much as practicable. From three to six hundred pounds of seed may be expected from an acre.'

EXPERIMENTS WITH FIELD ROOTS.

The land for all the field roots, including potatoes, was fallowed in 1900 by one deep ploughing and several surface cultivations to keep down weeds. In the fall after the ground was frozen, twenty loads per acre of well-rotted manure was spread evenly over the field and before seeding in the spring was ploughed in three inches deep and well harrowed. Frequent cultivation during the growing season was given all the roots.

The yield was computed from the weight of two rows 66 feet long and 30 inches apart.

EXPERIMENTS WITH TURNIPS.

A dry period ensued after the seed was sown and the second seeding did not germinate until after the rains on June 12. The catch of both seedings was very even, but after thinning, the turnip fly did considerable injury to the leaf on the first seeding, which was several weeks earlier than the second. No set-back took place after the second hoeing, and the weather being favourable for growth, a good crop of very fine roots was secured. The soil was clay loam, and twenty-nine varieties were tested. The first sowing was on May 21, the second on May 29, and all were pulled on October 11.

TURNIPS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Monarch	41	104	1,368	24	28	364	939	24
Perfection Swede	39	144	1,302	24	32	944	1,082	24
Selected Purple-top	37	1,900	1,265	..	26	140	869	..
Webb's New Renown	35	1,808	1,196	48	30	1,908	1,031	48
Sutton's Champion	34	1,696	1,161	36	27	1,308	921	48
Shamrock Purple-top	34	1,300	1,155	..	29	1,796	996	36
Prize Winner	33	1,452	1,124	12	26	932	882	12
Selected Champion	33	....	1,100	..	25	952	849	12
Magnum Bonum	33	....	1,100	..	28	1,156	952	36
Hall's Westbury	32	584	1,075	48	24	840	814	..
Halewood's Bronze-top	31	436	1,040	36	15	1,896	531	36
Hartley's Bronze	30	1,116	1,018	36	21	1,560	726	..
Prize Purple-top	30	192	1,003	12	36	72	1,201	12
Elephant's Master	29	344	972	24	24	1,500	825	..
Emperor Swede	28	1,948	965	48	22	1,540	759	..
Skirving's	28	1,288	954	48	27	120	902	..
Kangaroo	28	760	946	..	24	1,632	927	12
West Norfolk Red-top	28	496	941	36	20	1,976	699	36
Imperial Swede	28	232	937	12	26	536	875	36
Champion Purple-top	25	1,744	862	24	20	1,844	697	24
Mammoth Clyde	25	688	844	48	24	576	809	36
Giant King	25	160	836	..	16	1,132	552	12
East Lothian	24	972	816	12	20	1,316	688	36
Jumbo	23	1,265	787	36	19	280	638	..
Marquis of Lorne	23	992	783	12	23	1,124	785	24
Bangholm Selected	22	1,804	763	24	27	1,532	925	32
Carter's Elephant	22	352	739	12	14	1,436	490	36
Drummond Purple-top	21	360	706	..	15	1,680	528	..
New Arctic	20	1,976	699	36	25	1,480	858	..

EXPERIMENTS WITH MANGELS.

As with the turnips the second seeding did not germinate until after the rains on June 12. Except on high places in the field, too much rain kept the soil cold and none of the varieties made much progress until the month of August.

The roots were sound and fine and afford a large amount of feed.

Twenty-five varieties were tested, sown on clay loam. Two sowings were made in each case, the first on May 22, the second on May 29, and all were pulled on October 1.

MANGELS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Prize Mammoth Long Red	30	1,380	1,023	..	29	740	979	..
Ward's Long Oval-shaped	29	740	978	..	21	1,560	726	..
Canadian Giant	28	1,948	965	48	18	168	602	48
Prize-winner Yellow Globe	27	1,208	928	..	29	80	968	..
Lion Yellow Intermediate	27	912	915	12	27	1,572	924	12
Half-long Sugar Rosy	27	780	913	..	24	180	803	..
Selected Mammoth Long Red	26	1,856	897	36	28	1,816	963	36
Mammoth Yellow Intermediate	26	1,328	888	48	22	880	748	..
Giant Yellow Half-long	26	308	871	48	24	576	809	36
Giant Yellow Intermediate	25	952	849	12	22	1,936	765	36
Triumph Yellow Globe	25	292	838	12	24	444	807	24
Giant Yellow Globe	25	28	833	48	26	992	883	12
Half-long Sugar White	24	1,368	822	48	27	384	906	24
Gate-post	24	972	816	12	17	1,940	599	..
Norbiton Giant	24	972	816	12	21	504	708	24
Champion Yellow Globe	23	1,520	792	..	22	1,804	763	24
Leviathan Long Red	23	1,124	785	24	17	1,640	594	..
Yellow Intermediate	23	728	778	48	25	1,612	860	12
Mammoth Oval-shaped	23	332	772	12	28	1,552	959	12
Yellow Fleshed Tankard	22	1,672	761	12	19	1,864	664	24
Mammoth Long Red	21	1,824	730	24	19	1,336	655	36
Gate-post Yellow	20	1,448	690	48	18	960	616	..
Golden Fleshed Tankard	19	940	649	..	22	1,012	750	12
Warden Orange Globe	19	16	633	36	24	708	811	48
Red Fleshed Tankard	*10	1,648	360	48	8	236	270	26

* Did not germinate well.

EXPERIMENTS WITH CARROTS.

Neither of the seedings germinated until about the end of June, and in consequence the season of growth was not sufficiently long to produce a heavy crop, although the yield was much higher than was at one time thought possible.

All varieties of field roots were sown by drill on the flat, on clay loam soil. Twenty varieties of carrots were tested. The sowings were made in each case, the first on May 22, the second on May 29, and all were pulled on October 1.

CARROTS—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	lbs.	Bush.	lbs.	Tons.	lbs.	Bush.	lbs.
Ontario Champion	12	1,740	429	..	11	572	376	12
New White Intermediate	12	1,608	426	48	11	1,760	396	..
Half Long White	12	1,344	422	24	6	1,860	231	..
Iverson's Champion	12	1,212	420	12	10	592	343	12
White Belgian	12	816	413	36	11	1,668	394	28
Half Long Chantenay	12	816	413	36	8	1,688	294	48
White Vosges, Large Short	12	552	409	12	10	1,252	354	12
Mammoth White Intermediate	12	420	407	..	6	1,728	228	48
Green Top White Orthe	11	1,686	394	28	8	896	281	36
Improved Short White	11	1,232	387	12	12	1,080	418	..
Long Yellow Stump Rooted	11	968	382	48	10	1,780	363	..
Guerande or Ox-Heart	9	1,932	332	12	6	1,200	220	..
Yellow Intermediate	9	1,932	332	12	8	1,424	290	24
Scarlet Intermediate	9	1,400	323	20	9	216	203	36
Carter's Orange Giant	9	1,008	316	48	6	1,728	228	48
Giant White Vosges	8	1,744	295	44	8	1,952	299	12
Early Gem	7	1,312	252	12	7	652	244	12
Long Scarlet Altringham	7	784	246	24	5	448	174	8
Scarlet Nantes	7	388	239	48	6	1,464	224	24
Long Orange or Surrey	5	1,616	193	36	4	1,504	158	24

EXPERIMENTS WITH SUGAR BEETS.

Seven varieties of sugar beets were tested, all on clay loam soil, sown by drill on the flat. Two sowings were made in each case, the first on May 22, the second on May 29, and all were pulled on October 2.

SUGAR BEETS.—Test of Varieties.

Name of Variety.	Yield per Acre. 1st Plot.		Yield per Acre. 1st Plot.		Yield per Acre. 2nd Plot.		Yield per Acre. 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Royal Giant	29	1,664	994	24	26	8	866	48
Improved Imperial	27	1,440	924		20	1,844	697	24
Red Top Sugar	27	912	915	12	25	1,348	855	48
Danish Red Top	24	1,896	831	36	25	1,744	862	24
Danish Improved	18	1,784	629	44	23	860	781	
Wanzleben	16	1,396	556	36	19	1,600	660	
Vilmorin's Improved	16	624	543	24	16	472	541	12

EXPERIMENTS WITH POTATOES.

Eighty-nine varieties of potatoes were planted in drills 30 inches apart, in which the sets were dropped 14 inches apart. The seed potatoes were kept in bushel boxes in a cool cellar during the winter. Large sets with two eyes each were used and planted after being cut four days. When planted and when tops were appearing, the ground was well harrowed and afterwards scruffled until the stalks were too large to permit of this work.

The yield was computed from the weight of potatoes in one row, 132 feet long.

A few of the early varieties did not germinate evenly and the yield was poor. The medium early potatoes have given the best returns for the past two years. There was no rot in any of the varieties.

The cultivation of the land before planting was the same as for field roots. They were planted on May 20, on clay loam, and dug October 3.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre.		Yield per acre, Marketable.		Yield per acre, of Unmarketable.		Form and Colour
			Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Carman No. 1	Strong	Large	663	28	646	24	17	4	Oval, white.
Green Mountain	"	"	657	4	635	44	21	20	Long, "
Maggie Murphy	"	Very large	644	16	629	20	14	56	Long, dark red.
Carman No. 3	"	"	629	20	614	24	14	56	Oval, white.
Northern Spy	"	"	616	32	597	20	19	12	Long, dark red.
Rural Blush	Very strong	"	615	..	604	20	10	40	Oval, red.
General Gordon	Medium	"	612	16	597	20	14	56	" pink.
Country Gentleman	Weak	Large	610	8	567	28	42	40	Long, "
Delaware	Strong	Very large	603	44	582	24	21	20	Oval, white.
American Giant	Very strong	"	599	52	576	24	23	28	Long, white.
American Wonder	"	Large	599	28	573	52	25	36	Oval, white.
Dakota Red	"	Very large	595	12	580	16	14	56	Oval, dark red.
New Variety, No. 1	"	"	590	56	582	24	8	32	" white.
Burnaby Seedling	Strong	"	584	32	554	40	29	52	Long, light red.
Irish Daisy	Very strong	Large	582	24	548	16	34	8	Oval, white.
State of Maine	"	"	579	8	548	16	29	52	"
Dreer's Standard	Strong	"	576	..	554	40	21	20	"
Chicago Market	Medium	Very large	573	52	539	44	34	8	"
Rose, No. 9	Very strong	"	571	44	548	16	23	28	Oval, dark red.
Seedling, No. 230	Medium	Large	569	36	539	44	29	52	Oval, white.
Uncle Sam	Very strong	Very large	567	28	544	..	23	28	"
Quaker City	"	"	567	28	544	..	23	28	"
Late Puritan	"	"	556	48	533	20	23	28	Long, white.
Columbus	Strong	"	556	48	535	28	21	20	Oval, pink.
Clay Rose	Very strong	Large	548	16	533	20	14	56	" red.
Swiss Snow-flake	Weak	Medium	548	16	507	44	40	32	" white.
Great Divide	Very strong	Large	548	16	529	4	19	12	Long, red.
Cambridge Russet	Strong	"	546	8	524	48	21	20	" russet.
Lizzie's Pride	"	"	541	52	520	32	21	20	Oval, white.
Penn Manor	"	"	531	12	468	24	44	48	Long, light red.
Holborn Abundance	Very strong	Very large	531	12	512	..	19	12	Round, white.
Bill Nye	Strong	"	526	56	499	12	27	44	Long, white.
I. X. L.	Very strong	"	526	56	499	12	27	44	" light pink.
Empire State	"	"	524	48	503	28	21	20	" white.
Canadian Beauty	Strong	Medium	520	40	486	24	34	8	" pink.
Seattle	Very strong	Large	520	32	486	24	34	8	" white.
Early Sunrise	Weak	"	505	36	471	28	34	8	" pink.
Seedling No. 7	Very strong	"	505	36	482	8	23	28	Oval, red.
Flemish Beauty	Strong	Medium	499	12	471	28	27	44	Long, dark red.
Money Maker	Medium	Large	497	4	469	20	27	44	" white.
Pearce's Prize-winner	Very strong	"	492	48	458	40	34	8	" "
Sharpe's Seedling	"	"	486	24	439	28	46	56	" pink.
Irish Cobbler	Strong	"	486	24	456	32	29	52	Oval, red.
Troy Seedling	"	"	482	8	458	40	23	28	" white.
Sabean's Elephant	"	Small	480	..	462	56	17	4	Long, white.
Early Michigan	Weak	Small	480	..	420	16	59	44	Long, white.
Hale's Champion	Very strong	Large	477	52	448	..	29	52	Oval, white.
Prize Taker	Strong	"	477	52	454	24	23	28	Long, dark pink.
Reading Giant	Very strong	"	475	44	439	28	36	16	Oval, red.
New Queen	Strong	Very large	458	40	437	20	21	20	Long, red.
Pride of the Market	Weak	Large	458	40	437	20	21	20	Oval, white.
White Beauty	Strong	Medium	443	44	405	20	38	24	" "
Early Harvest	Weak	Very large	437	20	422	24	14	56	Long, white.
Brownell's Winner	Strong	Large	433	4	418	8	14	56	" red.
Polaris	Very strong	Medium	433	4	398	56	34	8	Oval, white.
Beauty of Hebron	Strong	Large	430	56	407	28	23	28	" pink.
Early St. George	Weak	Small	428	48	384	.	44	48	Long, pink.
Houlton Rose	Strong	Very large	428	48	422	24	6	24	" red.

Name of Variety.	Character of Growth.	Average Size.	Total Yield per Acre. Bush.	Lbs.	Yield per acre of Marketable. Bush.	Lbs.	Yield per acre of Unmarketable. Bush.	Lbs.	Form and Colour.
Bovee	Medium	Medium	416	..	369	4	46	56	Oval, pink.
Reeve's Rose	Strong	"	405	20	375	28	29	52	Long, red.
Sir Walter Raleigh	Very strong	Very large	398	56	390	24	8	32	Oval, white.
Lee's Favourite	Strong	Large	396	48	377	36	19	12	Long, red.
Brown's Rot-proof	Medium	Medium	396	48	371	12	25	36	Oval, dark red.
Early Six weeks	Weak	"	392	32	371	12	21	20	" pink.
McIntyre	Strong	"	392	32	379	44	12	48	Long, blue.
Thorburn	Weak	"	392	32	366	56	25	36	Oval, pink.
Early White Prize	"	"	390	24	352	..	28	24	Long, white.
Rochester Rose	Very strong	"	390	24	364	48	25	36	" red.
Pearce's Extra Early	Weak	Strong	379	44	334	56	44	48	Oval, pink.
Early Norther	Very strong	Very large	375	28	371	12	4	16	Long, dark pink.
Enormous	"	Large	373	20	362	40	10	40	Oval, white.
Earliest of All	Strong	Very large	371	12	366	56	4	16	Long, pink.
Vanier	Very strong	"	369	4	360	32	8	32	Oval, dark red.
Prolific Rose	"	Medium	366	56	337	4	29	52	Long, dark pink.
Early Ohio	Weak	Large	362	40	354	8	8	32	Oval, pink.
Daisy	"	Medium	334	56	302	56	32	..	Long "
Rural, No. 2	Very strong	Very large	315	44	309	20	6	24	Oval, white.
Maule's Thoroughbred	"	Medium	311	28	285	52	25	36	Long, red.
Rawdon Rose	Weak	Small	309	20	281	36	27	44	" pink.
Ohio Junior	"	Medium	300	48	277	20	23	28	Oval "
Early Market	"	Small	398	40	264	32	34	8	" "
Vick's Extra Early	Strong	Large	292	16	279	28	12	48	Long "
Burpee's Extra Early	Weak	Medium	292	16	270	56	21	20	Oval "
Everett	Very strong	Very large	281	36	277	20	4	16	Long, red.
Wonder of the World	Medium	Small	268	48	232	32	36	16	Oval, pink.
Early Andes	Weak	Medium	260	16	232	32	27	44	" "
Early Rose	Medium	Large	243	12	228	16	14	56	Long, red.
Early Puritan	Weak	"	177	4	174	56	2	8	" white.

THE VEGETABLE GARDEN.

The past season was satisfactory for most of the varieties of Vegetables. Beets, Carrots, Celery, Onions, Pease, Beans and Parsnips were exceptionally good ; while Cabbage, Cauliflowers and Tomatoes did fairly well. Marrows, Squash, Pumpkins and things of this nature set a very light crop, but some very fair sized fruit was produced.

ASPARAGUS.

On account of the dry weather early in the season, the crop of Asparagus was very light till rains came in June.

Conover's Colossal—In use May 17 to July 15

Barr's Elmira—In use May 17 to July 25.

Barr's Mammoth—In use May 17 to July 25.

BEANS.—Sown in open, May 9.

Variety.	Green, In use.	Ripe.	Remarks.
Imported Seed.			
Black Speckled	July 31	Sept. 12	Good cropper; late.
Fame of Vitry	" 21	" 5	" "
Canadian Wonder	Aug. 1	" 12	" "
Dwarf Emperor of Russia	July 21	Aug. 25	" early.
Dwarf Extra Early	" 19	" 17	" "
Experimental Farm Seed.			
Detroit Wax	July 19	Aug. 29	Good cropper; early.
Dwarf Kidney	" 19	" 20	" "
Currie's Rust-proof	" 15	" 17	" very early.
Stringless Wax	" 15	" 20	" early.
Early Six-weeks	" 21	" 17	Light crop; early.
Little Giant	" 26	" 17	The best; early.
Challenge Black Wax	" 15	" 20	One of the best; early.
Golden Wax	" 19		Good green; did not ripen.
Dwarf Triumph	" 19	Aug. 29	Good cropper; early.
Red German Wax	" 26		Light crop; did not ripen.
Flageolet Scarlet Wax	" 26	Sept. 10	Fair cropper; late.
Snow-pod	Aug. 1		Light crop; did not ripen.
Early Mohawk	July 19	Aug. 20	Early green; fair cropper.

BEETS.—Sown May 2. Pulled October 1.

Variety.	In use.	Bushels per Acre.	Remarks.
		Bush.	
Long Smooth Blood Red	July 16	627	Large; good shape.
Early Blood Red Turnip	" 22	528	Large; good shape and colour.
Nutting's Dwarf Improved	" 16	475	Large; coarse.
Egyptian	" 25	331	Good shape and colour; the best.
Dell's Black Leaf	" 15	286	Large; bad shape.

BROCOLI.—Sown in hot-house, March 28. Transplanted April 19.

Variety.	In use.	Weight.	Remarks.
		Lbs.	
Extra Early White	July 20	7	Good and solid.
Large White Mammoth	" 20	5	"

BRUSSELS SPROUTS.

Brussels Sprouts, Improved Extra, Half-dwarf Paris Market and Dwarf Improved, sown in hot-house March 27. Transplanted April 19. Set out May 20.

On account of dry weather early in the season, the plants were stunted and no sprouts formed.

GARDEN CORN.—Planted May 20.

Variety.	Green, In use.	Ripe.	Remarks.
Mitchell's Extra Early	Aug. 17	Sept. 15	Good crop ; some fine ears.
Extra Early Cory	" 17	" 15	" "
First of All	" 17	" 15	"
Adam's Extra Early	" 20	" 15	"
Crosby's Early Sugar	" 20		Did not ripen.
Early Minnesota			"
Mammoth White Cory	Aug. 20	Sept. 15	Late ; very little ripened.
Canada Yellow	" 16	" 10	Good table corn.
Squaw	" 17	" 5	Early ; good crop.
Early Giant, 1900	" 25		Did not ripen.
Early White Cory, 1900	" 20	Sept. 15	Fair crop.
First of All, 1900	" 17	" 15	"

CARROTS.—Sown April 25. Taken up, October 2.

Variety.	In use.	Bushels per Acre.	Remarks.
		Bush.	
Parisian Forcing	July 21	251	Large ; good shape.
French Horn	" 21	322	Small "
Luc Half-long	" 28	412	Short ; good root.
Long Blood Red	" 25	421	Smooth ; good shape.
Chantenay, 1900	" 21	421	Large, smooth ; good shape.
Scarlet Nantes, 1900	" 21	358	Small " "

CABBAGE.—Sown in hot-house, March 28. Transplanted to cold-frame, April 15. Set out in open, May 20. Taken up, October 6.

Variety.	In use.	Weight.	Remarks.
		Lbs.	
Express	August 6	6	Very fine heads.
Paris Market	" 2	6	Good heads.
Flat Parisian	" 6	10	"
Winningstadt Early	" 6	7	"
Drumhead St. John's Day	July 19	9	Very early, good heads.
Fottler's Improved Brunswick	August 6	10	Good heads.
Early Jersey Wakefield	July 19	7	Very early, fair heads.
Very Early Etampes	" 19	7	" "
Large Red Drumhead	August 10	15	Late, very fine heads.
Red Polish Short Stem	" 10	13	" "
Green Globe Savoy	" 6	8	Soft.

CAULIFLOWER.—Sown in hot-house, March 27. Transplanted to cold-frame, April 15. Set out in open, May 20.

Variety.	In use.	Weight.	Remarks.
		Lbs.	
Early Snow-ball	July 19	6	Fine heads.
Extra Selected Earliest Erfurt	" 21	6	Very fine heads.
Extra Early Paris	....	....	Did not germinate.
Chambourcy Mammoth	July 19	8	Large, solid heads.
Large Algiers	" 19	7	"
Autumn Giant	August 2	7½	"
Autumn King, 1900	" 2	7	"
Half Early Paris	....	....	Did not germinate.

CUCUMBERS.—Planted in hot-house, April 4; re-potted, April 21. Set out in open, May 17.

Variety.	In use.	Remarks.
Improved Long Green	July 30	Light crop. Small.
English Favourite	" 25	" "
Short Green Gerkin	" 10	" "
Early Frame	" 20	Fair crop. Small.
Giant Pera	" 20	Good crop. Large fruit. Best.

CELERY.—Sown in hot-house, March 27; transplanted, April 22. Set out in trenches, June, 3; taken up, October 7.

Variety.	In use.	Height.	Weight.	Remarks.
		Inches.	Pounds.	
Giant Pascal	October 7	30	3½	Large coarse.
Paris Golden Yellow	" 7	18	3	Very fine heads.
Rose-ribbed Paris	" 7	24	2½	"
Red Large-ribbed	" 7	24	2	"
White Plume	August 27	24	2	Excellent quality, small.
Giant Golden-heart	October 7	36	4	" large.
Pink Plume	August 31	30	2½	" small.
White Walnut	" 31	24	3	"
New Triumph	October 7	24	3	"

Lettuce.—First seeding, April 30 ; in use, May 30 ; second seeding, May 30 ; in use, June 25.

Variety.	Heads.	Remarks.
Spring Cabbage Varieties.		
Forcing Milly	Large	Good.
White Tennis-ball	Small	Very fine.
Wheeler's Tom Thumb	"	"
Red Edged Victoria	"	Good.
Summer Sorts.		
Algiers	Large	Very fine.
All the year round, black seed	"	Good.
All the year round, white seed	Medium	"
White Marvel of Cazard	"	"
Blonde Stone-head	Small	"
Brown Stone-head	Large	"
Early Ohio or Nonpareil	"	"
Neapolitan	Small	"
Marvel or Red Besson	Medium	"
Big Boston	Large	Very fine.
Hammersmith	"	Good.
Hardy Red Winter	Medium	"
Cos.		
Green Paris	Large	Very fine.
White Paris	"	"

Onions.—Sown in open, April 25. Sown in hot-house, April 8. Transplanted, May 30. Lifted, September 12.

Variety.	Yield, Sown in Open.	Yield, Transplanted.	Remarks.
	Bush.	Bush.	
Trebons	403	384	Good variety ; large, solid.
Straw-coloured White Spanish	403	304	Large, solid.
Wethersfield, Large Red	313	242	"
Blood Red	286	242	"
Paris Silver-skin	233	120	Good pickling.
White Dutch	233	130	Good bulbs.
James' Keeping	206	161	Small, solid.
Market Favourite Keeping	175	108	Small ; very good.
Danver's Yellow Globe	175	153	Good bulbs.

Melons.

Musk.—Dominion Green-flesh and Early Hackensack ; sown in hot-house, April 4 ; transplanted, April 21 ; set out, May 17. Light crop set and none ripened.

Water.—Stoke's Extra Early ; McIver's Sugar and South Dakota ; sown in hot-house, April 4 ; transplanted, Agril 21 ; set out, May 17. Light crop set and none ripened.

PEASE.—Sown May 8.

Variety.	In Use.		Ripe.		Size.	Remarks.
American Wonder	July	9	July	30	Small	Light crop.
Admiral	"	21	Aug.	16	"	Good crop.
Anticipation	"	28	"	26	Large	"
Alaska	"	9	July	30	Small	Light crop.
Burpee's Profusion	"	28	Aug.	25	Medium	Good crop.
Premium Gem	"	21	"	30	"	"
C. P. R.	"	31	Sept.	10	Large	"
Champion of England	"	31	Aug.	25	"	"
Daisy	....		....			Seed did not germinate.
Ever-bearing	July	21	Aug.	25	Medium	Good crop.
Extra Early	"	9	July	30	Small	Light crop.
First of All	"	9	"	30	"	Good crop.
Gradus	"	15	Aug.	25	Large	"
Horsford's Market Garden	"	23	"	25	Medium	"
Heroine						Seed did not germinate.
Laxton's Charmer	July	21	Aug.	16	Large	Good crop.
Nott's Excelsior	"	9	July	30	Small	"
Stratagem	"	31	Sept.	6	Large	"
Shropshire Hero	"	21	"	5	Medium	"
Prince of Wales	"	21	"	5	"	"
Queen	"	31	"	20	Large	"
Rural New Yorker	"	12	Aug.	5	Small	Light crop.
Telephone	"	26	"	30	Large	Good crop.
Yorkshire Hero	"	23	Sept.	25	Medium	"
First and Best	"	9	July	30	Small	"
Wm. Hurst	"	9	"	30	"	Light crop.

SQUASH AND MARROWS.—Sown in hot-house, April 13 ; transplanted, April 22 ; set out, May 17.

Variety.	Weight.	Crop.	Remarks.
	Lbs.		
Yellow Bush	12½	Good	Very fine fruit.
White Bush	8	Medium	" "
Mammoth Whale			Seed blown out.
Mammoth Red Hubbard	9	Good	Small, good fruit.
Crookneck	8	Medium	Large and soft.
Long White Bush	8	Good	" "
Vegetable Marrow	7½	"	" "

TURNIPS.—Sown, May 20 ; in use, July 21 ; pulled, October 7.

Variety.	Per Acre.	Remarks.
	Bush.	
Extra Early White Milan	735	Coarse, bad shape.
Early White Strap-leafed	645	Bad shape.
Half-long White Vertus	645	Good variety.
Yellow Golden Ball	592	"
Early Stone	511	"

TOMATOES.—Sown in hot-house, March 28 ; transplanted, April 19 ; set out, May 17.

Variety.	Green Fruit.	Ripe.	Size.	Remarks.
Dwarf Champion	July 10	Sept. 1	Small	Late, rough.
Imperial	" 19	Aug. 25	Large	Rough.
Early Michigan	" 10	" 20	Small	Smooth.
New Stone	" 15	Sept. 1	Large	"
Early Acme	" 10	Aug. 26	"	Rough.
Peach	" 20	" 28	Small.	"
Atlantic Prize	" 10	" 28	"	Smooth.
Extra Early Red	" 15	" 20	"	"
Canada	" 15	Sept. 1	Medium	"
Early Ruby	" 10	Aug. 20	Small	Rough.
Earliest of All	" 10	" 20	Medium	"
Red Cherry	" 20	" 30	Small	Smooth.
Yellow Plum	" 20	" 30	"	"
Ponderosa	" 20	Sept. 1	Large	"

CITRONS.

Sown in hot-house, April 4 ; transplanted, April 21 ; set out, May 17.
Red Seeded.—Weight, 8 pounds ; crop, fair ; small, even-sized fruit.
Preserving.—Weight, 5 pounds ; crop, fair ; small, even-sized fruit.

PUMPKINS.

Sown in hot-house, April 13 ; transplanted, April 22 ; set out, May 17.
Connecticut Field.—Weight, 41 pounds ; crop, good ; large, fine fruit.
Winter Surrey.—Weight, 35 pounds ; crop, good ; large, fine fruit.

PARSNIPS.

Sown, April 25 ; in use, October 1 ; taken up, October 1.
Hollow Crown.—233 bushels per acre ; large, fine roots.
Elcomb's Giant.—144 bushels per acre ; large, fine roots.

PEPPERS.

Large Red.—Sown March 28 ; fair crop, but did not ripen.

RADISHES.

First seeding, April 30 ; in use, May 25. Second seeding, May 30 ; in use, June 20.

Forcing Varieties.

Turnip Scarlet ; good variety.
Scarlet White Tipped ; good variety.
Deep Scarlet ; good variety.
Deep Scarlet Short-leaf ; good variety.

Turnip Varieties.

Early Scarlet, Early Scarlet White Tipped, Deep Scarlet, Early White small ; Very Early Yellow.

All good varieties.

Olive-Shaped.

Scarlet White Tipped, Half-long Deep Scarlet.

All good varieties, but on account of the dry weather early in the season, none of the Radishes germinated properly.

Winter.

Russian white, large, good ; Black Spanish, large, good ; China Scarlet, small.

PARSLEY.

Sown May 2 ; in use, July 1. Did well.

SAGE.

Sown May 2 ; in use, July 1. Made good growth.

TOBACCO.

Sown in hot-house, March 29 ; transplanted April 22 ; set out, May 22 ; frozen September 17. Not mature.

RHUBARB.

Victoria, in use from May 26 to September 15. Did well, good crop, fine stalks.
Linnaeus, in use from May 26 to September 15. Did well.

NEW SEEDING.

Giant and Linnaeus, sown May 1 ; transplanted July 25. Made good growth.

THE FLOWER GARDEN.

The flower garden was never more beautiful or so long in bloom as during the past season. Commencing on May 5 with Tulips, Crocuses and Pansies, a succession was kept up with Annuals and Perennials until November 2, when heavy frosts during several nights killed a large bed of Pansies, which never looked better than during the last week of October.

The Tulips did not make as good a showing as in former springs. Hot, dry weather set in just as they were coming in flower and a few days, from 14th to 19th May with temperature ranging from 85 to 95 degrees in the shade, killed the bloom.

All other Perennials, especially the Iris and Paeonies, did particularly well.

ANNUALS.—Propagated in hot-house. Sown in hot-house, March 27.

Variety.	Set Out.	In Bloom.		Remarks.
		From	To	
Agrostemma	May 22	June 29	Sept. 17	Did well. Small pink.
Amaranthus Superbus	" 22	July 20	" 17	Some fine plants.
" Tricolour	" 22	" 20	" 17	" "
" Willow-leaved	" 22	" 20	" 17	" "
Ageratum, Mexican Dwarf	" 22	" 8	" 17	Fine border plant.
Adonis Vernalis	" 22	....	17	Did not grow.
Abronia Umbellata	" 30	July 16	" 17	Very fine flowers.
Aquilegia Chrysantha Nana	" 30	....	17	Did not grow.

ANNUALS—*Concluded.*

Variety.	Set Out.	In Bloom.		Remarks.
		From	To	
Ænothera Drummondii	May 30	July 6	Sept. 17	Fine flowers.
Aster, Large Flowering	" 27	" 9	" 17	All varieties did well and the display throughout the season was very fine. Were in full bloom when frozen on September 17.
" Pyramidal Bouquet	" 27	" 9	" 17	
" Lilliput	" 27	" 9	" 17	
" Perfection	" 27	" 9	" 17	
" Half-dwarf	" 27	" 9	" 17	
" Queen of the Market	" 27	" 9	" 17	
" Mixed	" 27	" 9	" 17	
" Giant Comet	" 27	" 9	" 17	
" Queen of the Earliest	" 27	" 9	" 17	
" Japanese Tassel	" 27	" 9	" 17	
" Imbricated Pompon	" 27	" 9	" 17	
Briza Maxima	" 20	" 15	....	Very pretty grass.
Balsam, Double	" 20	June 15	Sept. 17	Very fine bloom.
Chrysanthemum, Double	" 30	July 5	" 17	Very strong growth but flowers were small.
" Frutescens	" 30	" 5	" 17	
" Car. Hyb.	" 30	" 5	" 17	
Coreopsis, Drummondii	" 30	June 20	....	A good display of bloom.
" Atkinsoniana	" 30	" 20	....	" "
Cosmos, Hybrid	" 30	" 20	....	Very strong growth.
Celosia, Pyramidalis	" 30	July 20	Sept. 17	Good plants.
" " Mixed	" 30	" 20	" 17	
Candytuft	" 30	June 6	" 1	Very fine showing.
Canterbury Bell	....	....	....	Did not germinate.
Centaurea Odorata	May 30	July 5	Sept. 17	Very fine showing.
Calendula	" 30	June 20	" 17	Fine, large bloom.
Dianthus, Mixed	" 30	July 5	" 17	The four varieties made an excellent show.
" Chinese Double	" 30	" 5	" 17	
" Plumarius Double	" 30	" 5	" 17	
" Chinese Single	" 30	" 5	" 17	
Dahlia, Single Dwarf	" 21	" 9	" 17	Did well.
Delphinium, Elatum	" 30	Aug. 30	....	Did not do well.
" Dwarf Candelabra	" 30	" 30	....	" "
" Large flowering	" 30	" 30	....	" "
Dianthus, Marguerite	" 30	July 5	....	Made excellent show.
" Indian Pink	" 30	" 5	....	" "
" Mixed	" 30	" 5	....	" "
Gaillardia, Grandiflora	" 30	June 20	Sept. 17	Very good show.
" Picta	" 30	" 20	" 17	" "
Godetia, Mixed	" 30	" 14	" 17	Did well. Good show.
" Tall Mixed	" 30	" 14	" 17	" "
" Splendens	" 30	" 14	" 17	" "
Gypsophila elegans	" 30	July 8	" 17	Small, tender pink flowers.
Helichrysum	" 30	" 20	" 17	Some fine flowers.
Hollyhock, Double Mixed	" 30	....	....	Made fair growth.
Iberis Gibralteriana	" 30	Aug. 15	Sept. 27	Very pretty late in season.
Lobelia	" 30	June 22	" 17	Did well. Good border plant.
Linum Grsndiflorum	" 30	July 8	....	Did fairly well.
Marvel of Peru, Mixed	" 30	" 21	Sept. 17	Strong growth. Very fine flowers.
" Variegated	" 30	" 21	" 17	
Nigella	" 22	" 5	" 10	Did well. Pretty flower.
Nicotina	" 22	June 29	" 17	Did fairly well.
Sultan Marguerite	" 28	" 2	....	Very fine bloom.
Sweet Alyssum	" 22	" 25	....	Fine bloom.
Stocks, German Large	" 20	" 24	Sept. 17	Made very fine show. Flowered till frozen, and some of the spikes were very beautiful.
" Double	" 20	" 24	" 17	
" Victoria	" 20	" 24	" 17	
Verbena, Hybrid	" 21	July 1	....	Made good show.
Salpiglossis	" 30	" 20	Sept. 17	Some good flowers.
Scabiosa	" 30	" 5	" 17	Did well.
Swan River Daisy	" 30	" 20	" 17	Did well. Very pretty flower.
Phlox, Mixed	" 22	June 16	" 17	Very fine show.
" Dwarf	" 22	" 16	" 17	" "
Zinnia, Double	" 21	" 22	" 17	Some large blooms.
Petunia, Grandiflora	" 22	" 20	" 17	Extra fine.
" Giant of California	" 22	" 20	" 17	"
" hybrida flore pleno	" 22	" 20	" 17	"
Portulaca, Double Mixed	" 22	July 10	" 17	Did well.

ANNUALS—SOWN IN THE OPEN.

Variety.	Sown.	In Bloom.	Remarks.
Helianthus	May 4	July 25	Good growth, large blossoms.
Nasturtium	" 4	" 6	Good show, fine blossoms.
Sweet Pease	" 3	" 20	Did well after rains came.
Poppy	" 7	" 30	Did not do well.
Ageratum	" 4	... .	Seed did not germinate.
Alyssum	" 4	July 1	Good show.
Aster	" 4	" 15	Some fine blooms.
Antirrhinum	" 4	" 10	Very fine.
Candytuft	" 4	" 5	"
California Poppy	" 4	" 10	"
Chrysanthemum	" 4	" 12	Good show.
Coreopsis	" 4	" 8	Did not do well.
Calliopsis	" 6	" 8	Fine show.
Centaurea	" 6	" 8	Large blossoms.
Helichrysum	" 6	" 20	Good show.
Dianthus	" 6	" 15	Very fine blooms.
Linum Grandiflorum	" 6	" 8	Good show.
Swan River Daisy	" 6	" 15	"
Gaillardia	" 6	" 15	"
White Swan Poppy	" 6	" 10	"
Gysophila Elegans	" 6	" 10	Small pink flower.
Mignonette	" 6	" 1	Did well.
Phlox Drummondii	" 4	" 10	"
Zinnia	" 4	" 8	Fine large bloom.
Marigold	" 4	" 23	Made fine show.
Salpiglossis	" 4	" 20	Some very fine bloom.

PERENNIALS (OLD BEDS).

Beds of Pansies, Sweet William, Larkspur, Columbine, Lychnis and Everlasting Pea, came through the winter in good condition and flowered freely during the season.

The Pansies and Sweet William were particularly fine, the former continuing to bloom until frozen solid in November.

BULBS

Tulips.

In bloom on May 5. On account of hot dry weather, when Tulips came in bloom, the flowering was irregular ; the flowers were small, and some dried up before opening.

Gladioli.

Transplanted May 29 ; in bloom July 21. Were in full bloom about the end of July, and the bed was one of the most attractive in the garden.

Cannas.

The following varieties were set out on May 20 and came in bloom July 15. Some of the specimens were magnificent in bloom. The following were tested :—

Austria, Allemania, Aphrodite, Asia, Burbank, Baron de Poily, C. Bernardin, Comte de Bouchard, Explorateur Campbell and Florence Vaughan.

Dahlias.

In bloom on July 1. Twenty-two varieties were tested and some very large and beautiful flowers were grown. Among the finest, were :

Liliputian, Little Pigmy, Snow-clad, Woman-in-white and Cactus Queen.

The latter was very like a Chrysanthemum, and had not the stiff appearance generally noticed in Dahlias.

The following were also tested :—

Bird of Passage.
Cochineal.
Chairman.
Chimson Beauty.
Constance.
Clifford W. Burton.
Fairy Queen.
Gem.
Hector.
Herbert Turner.
Herbert.
John Sladd
Lyndhurst.
Lady Antrobus.
Mantas la Villa.
Mrs. Peart.
Mrs. Langtry.
Nemesis.
Perfect Vallose.
Sambo.
Victory.
Wm. Agnew.

Iris.

Of the Iris received from the Central Experimental Farm, and planted in 1900, the following died during the winter of 1900-01 :

Iris Germanica,
" " *Asiatica,*
" *goldenstadtiana coeruiescens,*
Iris plicata Lord Seymour,
" " Reine des Belges,
" " Swertii,

The following maintained a very fine succession of bloom from May 24 to July 20, and on account of the deep green of the foliage, the bed was attractive during the whole season :

Iris amœna, Crebillon,
" " Mrs. H. Darwin.
" " Julia Grisi.
" " Maria Theresa.
" " Victor Lemoine.
" *aurea.*
" *Balkana.*
" *biflora.*
" *biglumis.*
" *Blondovi.*
" *cristata.*
" *chamaeiris.*
" *ensata.*
" *flavescens.*
" *florentina.*
" *furcata.*
" *Germanica.* Verschuur.
" *gigantea.*
" *Hungarica.*
" *neglecta*, Agathe.
" " Arlequin Milanais.
" " Hericartiana.
" " Sappho.
" *nudicaulis.*
" *orientalis.*
" *oxypetala.*
" *pallida.*
" *prismatica.*
" *pumila.*
Iris pumila cinerea.
" " *gracilis.*
" " *lutea.*
" *ruthenica.*
" *sibirica.*
" " *alba.*
" " *haematophylla.*
" " *violacea.*
" *squalens.*
" " Bronze Stoffels.
" " Dina.
" " Hector.
" " La Marmora.
" " La Tristesse.
" " Minerve.
" " Tarquin.
" *variegata.*
" " Arquinto.
" " Coquette.
" " Darius.
" " Gracchus.
" " Henry Havard.
" " Honorabile.
" " Innocenza.
" " Pancrace.
" " Samson.
" " Souvenir.
" " Minos.
" *virescens.*

PERENNIAL PHLOX.

In May, 1900, 23 varieties were received from the Central Experimental Farm, and planted. The following lived through the winter but made very little progress this year :

Phlox decussata Sorpillum.

Phlox decussata, New Dwarf White.

Phlox reptans.

PAEONIES.

Of the 33 varieties received from the Central Experimental Farm, and planted in May, 1900, 17 died during the summer of that year or the winter of 1900-01.

The following varieties came through the winter in good condition and formed a very attractive bed during the season. Some of the white varieties were very fine.

Paeonia sinensis, Thorbecki.
" " Souvenir de l'Exp. Universelle.
" " Mons. de Villeneuve.
" " Albiflora Thorbecki.
" " Officinalis Mutabilis.
" " Professor Morren.
" " Festiva Maxima.
" " De Candolle.

Paeonia sinensis, Mutabilis.
" " rubicunda albo marg.
" " rubra plenissima.
" " Festiva.
" " Duchess d'Orleans.
" " Ambroise Verschaffelt.
" " Prosper d'Aremberg.
" " L'Eclatante.

HERBACEOUS SPIREAS.

Twelve varieties were planted in the spring of 1900, but not a single plant lived through the winter.

OTHER PERENNIALS.

A fair proportion of the large list of sundry Perennials received last year from the Experimental Farm, Ottawa, came through the winter in good condition and bloomed this year. Following is a list of the varieties living at the end of this season :—

Achillea millefolium rubrum.
" Sibirica Blush.
" " White.
" Ptarmica fl. pl.
Acorus spurius.
Asarum Canadense.
Ajuga reptans atropurpurea.
" Genevensis.
Aster Noviæ Angliæ roseus.
" " Newry seedling.
" " Top Sawyer.
" " W. Bowman.
" " White Queen.
Asclepias tuberosa.
Artemisia stellarianum.
Boltonia latisquama.
" asteroides.
Chelone barbata.
Clematis recta.
Coreopsis delphinifolia.
Centaurea montana alba.
" macrocephala.
Campanula Rainerii.
Doronicum Clusii.
Erigeron macranthus.
Funkia lancifolia.
" Sieboldiana.
Geranium maculatum.
Helenium grandiflorum.
Heuchera sanguinea.

Hemerocallis Dumortieri.
" fulva.
" Kwanso fl. pl.
" variegata fl. pl.
" Midendorfii.
" disticha fl. pl.
" graminifolia.
Helianthus Maximiliana.
" giganteus.
" autumnale.
Lupinus polyphyllus.
Lilium superbum.
Lysimachia nummularifolia.
" punctata.
" clethroides.
Poterium officinale.
Pyrethrum uliginosum.
Phalaris arundinacea fol. var.
Physostegia Virginica alba.
Rudbeckia laciniata.
Sempervivum Boulicianum.
Symphitum asperrimum.
Sidalcea candida.
Solidago gigantea.
" rigida.
Thermopsis fabacea.
" Caroliniana.
Veronica spicata.
" Virginica.
" elegans carnea.

TREES AND SHRUBS.

The trees and shrubs on the Farm have never been in a more healthy and vigorous condition than during the past season. There being no spring winds or frosts to injure even the most tender varieties ; all made a rapid and strong growth from the start. Every tree and bush on the Farm was in full leaf on May 24.

The growth during the season was remarkable in all species and varieties. Maple trees and hedges, willow hedges and elm trees made from 4 to 6 feet, and all new wood was well ripened before winter set in.

Unfortunately, in September, a very heavy storm of wet snow broke down a good many varieties of trees and shrubs and was particularly severe on the hedges, several of which were flattened to the ground. As far as possible the snow was shaken off by hand, but with the miles of avenues and hedges on the Farm, the extent to which this work could be carried on was comparatively small.

Of the shrubs, the Siberian pea-tree, lilacs, honeysuckles and spireas did particularly well. The lilacs were a mass of bloom beginning May 19 and made by far the best showing we have ever had. The same, in fact, was the case with all shrubs, but the lilacs so much surpassed any former year, that they were very noticeable.

Like the trees, all varieties of shrubs thoroughly matured their wood and are in good condition to stand the winter.

The distribution of trees, tree seeds, shrubs and shrub seed was larger than usual last spring, but the demand was very largely in excess of the supply available for that purpose.

A fungus destroyed the maple seed throughout the greater part of Assiniboia, this year, and the seed for distribution had to be obtained from Manitoba. The trees on the Farm bore more than sufficient seed to supply all applicants, but it was rendered useless by this fungus. Ash, elm and caragana seed was abundant and good, and a sufficient supply has been secured.

THE DISTRIBUTION OF SEEDLING TREES BY THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR.

The Department of the Interior, Ottawa, having decided to grow trees for distribution among the settlers of the North-west Territories, fifteen acres of land on the Experimental Farm was granted by the Department of Agriculture for the use of the Forestry Branch, under Mr. E. Stewart, superintendent, for the purpose of raising seedling trees.

This land was in good condition ; but when the maple seed was sown, a very dry spell set in and only a small proportion of the seed germinated. In addition to the maple, seed of elm, birch, ash and caragana arborescens was sown, and cuttings of poplar and willow planted.

A great many thousand trees will be available for distribution next spring, and by the spring of 1903, with the additional land taken, there should be many hundreds of thousands ready for the same purpose.

In the past twelve years the demand for trees and shrubs from the Experimental Farm has been far greater than the supply ; and it will tax the resources of the Forestry Branch to meet the demands, which are steadily on the increase, for trees for the southern portion of the Territories.

It is not intended to curtail the extent of the Experimental Farm distribution, and from the number of applications already received, more material than ever will be required for the coming spring ; but the Experimental Farms have received instructions to render the Forestry Branch every assistance in the good work they have undertaken.

ARBORETUM.

The Arboretum made good progress during the season, and as many of the species and varieties are now flowering and fruiting, it is becoming one of the most attractive spots on the Farm.

Following will be found a list of the species and varieties at present under test, with date planted, and notes as to hardiness. Those which have come through one or more winters without injury, or with very slight injury to the tips only, have been marked 'hardy' ; where the new wood has been killed back to one-half its growth, such

are said to be 'half hardy,' and those which have had their wood killed by winter, to the ground, have been noted as 'tender.' The list also includes a number of varieties which were received and planted last spring. Of course no opinion can be expressed at present as to the hardiness of these.

Name.	Common Name.	Planted.	Remarks.
Acanthopanax sessiliflorum		1900	Nearly hardy.
Acer dasycarpum	White maple	1896	Half hardy.
" Negundo	Box-elder	1895	Hardy.
" platanoides	Norway maple	1896	Half hardy.
" saccharinum	Rock or Sugar maple	1899	"
" " Minnesota seed No. 1		1897	Nearly hardy.
" tataricum Ginnala	Ginnalian maple	1895	Hardy.
Alnus glutinosa	Common alder	1896	Half hardy.
" " imperialis	Imperial cut-leaved alder	1899	Tender.
" viridis	Green alder	1896	"
Amelanchier alnifolia	Alder-leaved June-berry	1895	Hardy.
Amorpha canescens	Lead plant	1900	Half hardy.
Artemisia Abrotanum	Old man	1895	"
" " tobolskianum		1895	"
Berberis amurensis	Amur Barberry	1899	Hardy.
" aristata		1896	Half hardy.
" cerasina		1896	Hardy.
" cretica	Cretan Barberry	1899	Nearly hardy.
" Fischeri		1896	Half hardy.
" ilicifolia	Holly-leaved Barberry	1896	Tender.
" Sieboldii	Siebold's "	1898	Half hardy.
" sinensis	Chinese "	1896	"
" Thunbergi		1897	"
" Hybrid No. 2		1899	Nearly hardy.
" vulgaris iberica		1899	"
" " japonica		1899	Half hardy.
" " foliis purpureis		1896	Tender.
" " violacea		1897	Nearly hardy.
Betula alba	European White Birch	1895	Hardy.
" " fastigiata	Pyramidal Birch	1899	Tender.
" " laciniata pendula	Cut-leaved "	1899	"
" " pendula Youngii	Young's Weeping Birch	1900	Half hardy.
" davurica		1896	Hardy.
" (from Niemetz)		1898	Half hardy.
" lenta	Sweet Birch	1899	Nearly hardy.
" papyrifera	Paper "	1896	"
" populifolia	White "	1899	"
" pumila	Low "	1899	Hardy.
Caragana arborescens	Siberian Pea-tree	1895	"
" Chamlagu		1900	"
" frutescens	Woody caragana	1895	"
" " mollis glabra		1896	"
" grandiflora	Large-flowered caragana	1896	"
" microphylla		1901	
" pygmaea	Dwarf caragana	1896	"
" " aurantiaca		1900	"
Celastrus scandens	Climbing Bitter-sweet	1898	Half hardy.
Celtis occidentalis	Hack-berry	1901	
Clematis flammula	Sweet-scented Virgin's bower	1898	Half hardy.
" ligusticifolia		1898	Hardy.
" vitalba	Common traveller's joy	1898	Half hardy.
" viticella		1901	
Cornus alba Sibirica	Siberian Dogwood	1897	Hardy.
" " variegata	Variegated "	1897	Nearly hardy.
" amomum		1897	Tender.
" Baileyi		1899	Hardy.
" sanguinea		1897	Half hardy.
" Spathii Golden		1899	Tender.
" stolonifera		1896	Hardy.
Cotoneaster acutifolia		1899	"
" integerrima	Common Cotoneaster	1896	"
" laxiflora		1899	"
" No. 10 (Niemetz)		1898	"

Name.	Common Name.	Planted.	Remarks.
Crataegus chlorosarca		1896	Hardy.
" coccinea	Scarlet Haw	1896	"
" Crusgalli	Cockspur thorn	1896	"
" nigra		1900	"
" Oxyacantha sibirica		1897	"
" No. 9 (Niemctz)		1898	"
" sanguinea		1897	"
Cytisus biflorus		1899	Teuder.
" capitatus		1899	Hardy.
" nigricans		1899	Half hardy.
" " longispicatus		1898	Tender.
" sessilifolius		1896	Half hardy.
Elaeagnus angustifolia	Russian Olive	1895	Hardy.
" argentea	Wolf willow	1895	"
Euonymus atropurpureus	Burning bush	1896	Half hardy.
" europeus	Common spindle-tree	1896	"
" obovata		1899	Tender.
Fraxinus americana	White ash	1896	Nearly hardy.
" berlanderiana	Berlander ash	1897	Tender.
" nigra	Black ash	1899	Hardy.
" pennsylvanica	Red ash	1895	"
" " lanceolata	Green ash	1899	"
" quadrangulata	Blue ash	1897	Tender.
Genista tinctoria Sibirica		1899	"
Gleditschia triacanthos inermis		1900	"
Gymnocladus canadensis	Kentucky Coffee-tree	1898	"
Hippophae rhamnoides	Sea-buckthorn	1901	
Hydrangea paniculata, grandiflora		1896	Tender.
Laburnum alpinum		1899	"
Ligustrum amurensis	Amur privet	1899	Half hardy.
" vulgaris fol. aureis variegatis		1899	Tender.
Lonicera Alberti	Albert Regel's Honeysuckle	1896	Hardy.
" glauca	Glaucous-leaved	1899	"
" gracilipes		1898	"
" hirsutus	Hairy Honeysuckle	1899	"
" Periclymenum	Woodbine	1901	
" punicea		1899	Tender.
" ruprechtiana		1901	
" Sullivantii		1901	
" tatarica	Tartarian honeysuckle	1896	Hardy.
" Xylosteum		1899	"
Memispermum dauricum		1900	Tender.
Neillia opulifolia	Ninebark	1900	Hardy.
Ostrya virginica	Ironwood	1899	Hardy.
Philadelphus deutziaeflorus		1896	Half hardy.
" grandiflorus	Large flowered Syringa	1896	"
" hybridus Lem Boule d'Argent.		1899	Tender.
" Keteleerii flore pleno		1900	"
Photinia variabilis arguta		1899	"
Pyrus aria flabelliformis		1897	Hardy.
" baccata	Siberian crab	1896	"
" rotundifolia		1900	Tender.
" americana	American Mountain ash	1896	Hardy.
" aucuparia	European " "	1896	Half hardy.
" Maulei	Maule's Japanese Quince	1899	"
Prunus Maximowiczii		1899	Hardy.
" pennsylvanica	Wild Red cherry	1895	"
" pumila		1895	"
" demissa	Western wild cherry	1895	"
" grayana		1896	"
" Maackii		1896	"
" serotina	Wild Black cherry	1899	Half hardy.
Populus alba nivea		1896	Hardy.
" " pyramidalis	Pyramidal Silver poplar	1896	Nearly hardy.
" balsamifera	Balsam poplar	1895	Hardy.
" berolinensis		1895	"
" certinensis		1896	"
" deltoidea	Cotton-wood	1895	"
" " aurea	Golden-leaved poplar	1901	
" nigra	Black poplar	1898	"
" " betulaefolia		1896	"

Name.	Common Name.	Planted	Remarks.
Populus nigra Nolesti		1896	Hardy.
" petrowskyana		1896	"
" suaveolens		1898	"
" tremuloides	American aspen	1895	"
" Wobstii		1896	"
Potentilla fruticosa	Shrubby Cinque-foil	1899	"
Quercus coccinea	Scarlet Oak	1899	Half hardy.
" macrocarpa	Mossy-cup Oak	1895	Hardy.
Rhamnus cathartica	Common Buck-thorn	1896	"
" crenata		1900	Tender.
" davurica		1899	Hardy.
" Frangula		1896	"
" No. 13 (Niemetz)		1898	"
Rhus glabra	Smooth Sumach	1896	Nearly hardy.
Ribes alpinum	Mountain Currant	1899	Tender.
" " pumilum		1899	Hardy.
" aureum	Missouri Currant	1899	"
" " tenuiflorum		1901	
" cereum	White-flowered Currant	1899	"
" gordonianum		1899	Tender.
" robustum		1899	"
" (from Cypress Hills)		1900	Hardy.
" Sibirica		1898	"
Rosa blanda	Smooth Rose	1898	"
" californica		1899	Half hardy.
" ferruginea	Purple leaved Rose	1895	Hardy.
" rugosa	Japanese Rose	1896	"
" villosa pomifera		1898	Nearly hardy.
Rubus balfouriana		1900	Hardy.
" caesius		1900	"
Sambucus canadensis	Common Alder	1896	Nearly hardy.
" nigra aurea nova		1896	Tender.
" " foliis aureis		1896	"
" " heterophylla		1896	"
" " Swindonensis		1899	"
" No. 45 (Niemetz)		1898	"
" (Blue-fruited from B.C.)		1899	"
" nigra virescens		1899	"
Shepherdia argentea	Buffalo Berry	1895	Hardy.
Salix alba argentea	Silver leaved Willow	1897	Half hardy.
" " britzensis		1896	Hardy.
" aurea pendula		1896	Nearly hardy.
" Bataviæ		1898	"
" Caprea	Goat Willow	1897	Half hardy.
" daphnoides	Violet Willow	1895	Hardy.
" longifolia argyrophylla		1898	Half hardy.
" Nicholsoni purpurescens		1898	Nearly hardy.
" nigricans	Dark broad leaved Willow	1898	"
" pentandra	Laurel leaved Willow	1896	Hardy.
" purpurea pendula		1896	"
" rubra forbyana		1896	Half hardy.
" Salamoni		1898	"
" triandra		1897	Hardy.
" Voronesh	Voronesh Willow	1895	"
Spiræa arguta		1896	"
" chamaedrifolia		1896	"
" discolor	White-beam leaved Spiraea	1899	Half hardy.
" japonica	Japanese Spiraea	1899	Tender.
" " alba	White Japanese Spiraea	1899	Half hardy.
" " Bumalda		1899	Tender.
" " superba		1896	"
" media		1899	"
" salicifolia	Common Meadow-sweet	1899	Hardy.
" sorbifolia	Sorbus leaved Spiraea	1898	Half Hardy.
" tomentosa	Hard-hack	1898	Tender.
" Van Houttei		1895	Half hardy.
Symphoricarpus Heyeri		1900	Tender.
" racemosus	Snow-berry	1895	Hardy.
Syringa chinensis	Rouen Lilac	1896	Hardy.
" Josikea	Josika's Lilac	1895	Nearly hardy.
" pekinensis	Pekin Lilac	1899	Half hardy.

Name.	Common Name.	Planted	Remarks.
Syringa villosa		1895	Hardy.
" vulgaris	Common Lilac	1895	"
" " Abel Carrière		1901	
" " Alba	White Lilac	1899	Hardy.
" " " Grandiflora		1899	"
" " Alphonse Lavallee		1901	
" " Charles Joly		1901	
" " Charles X		1899	Hardy.
" " Condorcet		1901	
" " Congo		1901	
" " Emilie Lemoine		1901	
" " Francisque Morel		1901	
" " Jean Bart		1901	
" " La Tour d'Auvergne		1901	
" " Lemoinii		1901	
" " Mad. Casimir Perier		1901	
" " Mad. Lemoine		1901	
" " Marie Legraye		1901	
" " Mathieu de Dombasle		1901	
" " Michel Buchner		1901	
" " President Grevy		1901	
" " Maxime Cornu		1901	
" " purpurea		1896	Hardy.
" " Virginite		1901	
Tilia americana	Basswood	1896	Half hardy.
Ulmus americana	American Elm	1895	Hardy.
Viburnum Lantana	Wayfaring tree	1898	Half hardy.
" Opulus	High-bush Cranberry	1895	Hardy.
" " sterile	Snow-ball	1898	Half hardy.
" prunifolium	Black haw	1899	Hardy.
Coniferæ.			
Abies balsamea	Balsam Fir	1896	Hardy.
" " variegata	Variegated Fir	1900	Tender.
" lasiocarpa		1898	Half hardy.
Juniperus communis	Common Juniper	1901	
" Sabina	Common Savin	1901	
" " variegata	Variegated Savin	1901	
" virginiana elegans variegata		1899	Hardy.
" " glauca		1899	Half hardy.
" " Schotti		1899	Hardy.
" " tripartita		1899	Tender.
Larix europea	European Larch	1899	Nearly hardy.
" pendula	American Larch	1896	Hardy.
Pseudotsuga Douglasii	Douglas Spruce	1895	Nearly hardy.
Picea alba	White Spruce	1895	Hardy.
" " coerulea		1901	
" " variegata		1899	Hardy.
" alcockiana	Alcock's Spruce	1898	Tender.
" excelsa	Norway Spruce	1895	Nearly hardy.
" " pendula major		1899	Tender.
" " pyramidalis	Pyramidal Norway Spruce	1899	Nearly hardy.
" nigra	Black Spruce	1901	
" obovata schrenkiana		1899	Hardy.
" pungens	Rocky Mountain Spruce	1895	"
" " glauca		1899	"
Pinus Cembra	Stone Pine	1895	"
" Laricio nigricans	Austrian Pine	1899	Tender.
" montana	Mountain Pine	1895	Nearly hardy.
" " Mughus	Dwarf Mountain Pine	1899	Half hardy.
" sylvestris	Scotch Pine	1895	Nearly hardy.
Thuya occidentalis	White Cedar	1895	"
" " Hoveii	Hovey's Arbor-vitæ	1900	Half hardy.
" " Meehani	Meehan's Arbor-vitæ	1900	Tender.
" " Columbiae		1899	Nearly hardy.
" " Wareana	Ware's Arbor-vitæ	1899	"

Sample Hedges.

The sample hedges did well this year. The following varieties have been added to the last list :—

Celtis Occidentalis, Cornus Stolonifera, Abies Balsamea, Picea Nigra, Juniperus Communis, Picea Coerulea.

FRUIT TREES AND BUSHES.

The season was most favourable for fruits of all kinds with the exception of black currants and strawberries, and the crops of crab apples and plums were the best ever produced on the Farm.

Nearly all varieties came through the winter in good condition and blossomed freely. Warm weather with a sufficient amount of rain, rushed the fruit forward and with the exception of a few varieties of late plums, everything had matured before the frost of September 17, which was hard enough to ruin all unpicked fruit.

No damage was occasioned by insects, except in the case of plum trees which were attacked by an Aphis in July. The trees were sprayed twice with kerosene emulsion, and so far as could be observed, did not sustain much injury from the attack.

SEEDLING APPLES.

The two seedlings each of Tonka and Arctic, planted in the spring of 1899, have continued to do well. The trees were alive at the tips this spring and made strong growth during the season.

In 1900, six trees each of Wealthy, Blushed Calville and Hibernal, received from Mr. A. P. Stevenson, Nelson, Manitoba, were planted. Four Wealthy and two Blushed Calville lived through the winter and made fair progress this season.

GRAFTING.

Last spring scions of hardy apples and crab apples were received from Mr. A. P. Stevenson, Nelson, Manitoba, and top-grafted on the Pyrus Baccata and Pyrus Prunifolia which were planted in 1896, and have been fruiting for two or three years.

Thirteen trees were top-worked by Mr. Geo. Lang, with from 4 to 10 scions each.

The following grafts struck and made strong growth during the season :—

Two Hibernal on Pyrus Baccata Macrocarpa.
One Antonovka on Pyrus Prunifolia.
Three Anisette on Pyrus Prunifolia.
One Lieby on Pyrus Baccata Cerasiformus.
Two Transcendent on Pyrus Baccata Macrocarpa.

FRUITING.

CRAB APPLES (*Pyrus Baccata*).

Planted 1896.

The trees wintered well and by May 18 were a mass of bloom. A strong, healthy growth has been made during the season and the wood ripened fairly well before winter set in. The heavy snow storm on September 23, 1901, did con-

siderable damage to the limbs and branches, but on account of the upright character of most of the trees the breakage was not so severe as to cause permanent injury.

The varieties have all grown well and continue to be perfectly hardy. The notes following are confined to fruiting.

To test the fruit a considerable quantity was made into jelly and pickles, and for either of these commodities nothing better could be desired. The astringency of the fruit disappears in the jelly, and the acidity can be overcome by the addition of sugar.

INDIAN HEAD SEEDLINGS.

Pyrus baccata genuina—

Three trees fruited ; ripe September 10 ; fruit about size of Baccata.* Colour yellow with red cheek ; rather acid and slightly astringent.

Pyrus baccata cerasiformis—

Ten trees fruited ; ripe September 5 to 10 ; fruit larger than Baccata ; crop, heavy ; generally acid and astringent.

Pyrus baccata macrocarpa—

Seventeen trees fruited ; ripe September 5 ; fruit generally considerably larger than baccata and the best grown this year. Notes taken on one of the best of these read as follows :—

Row 4, No. 4.—Fruited lightly ; fruit one inch in diameter ; colour, red, streaked ; flat ; Calyx persistent ; flesh juicy and very slightly astringent ; excellent quality. The best crab apple grown this year.

Pyrus baccata sanguinea—

Four trees fruited ; ripe September 1 to 5 ; early ; generally smaller than baccata ; slightly acid and moderately astringent ; flavour good but fruit small.

Pyrus prunifolia—

Eleven trees fruited; ripe September 5 to 10; generally about the size of baccata, juicy, acid and astringent.

SEEDLINGS RECEIVED FROM CENTRAL EXPERIMENTAL FARM, OTTAWA.

Pyrus baccata sanguinea—

Three trees fruited ; ripe September 12 ; considerably larger than baccata ; juicy, slightly bitter and moderately astringent.

Pyrus baccata aurantiaca—

One tree fruited ; size of baccata ; red, slightly bitter and astringent, but juicy and of better flavour than the average.

Pyrus baccata macrocarpa—

One tree fruited ; ripe September 18 ; larger than baccata ; light crop ; yellow with red cheek, juicy, acid and astringent.

Pyrus prunifolia intermedia—

One tree fruited ; ripe September 11 ; a little larger than baccata ; light crop; red juicy, acid and slightly astringent.

*The ordinary form of P. baccata has fruit about the size of a large cultivated cherry.

Pyrus baccata cerasiformis—

Four trees fruited ; ripe September 10 to 20 ; generally about the size of baccata ; rather flat in form ; juicy, red, astringent ; medium crop.

Pyrus baccata genuina—

Five trees fruited ; ripe September 5 to 10 ; fruit generally smaller than baccata ; juicy, slightly acid and very astringent.

HYBRID CRABS.

(Planted spring of 1898 and 1899).

Were transplanted in 1900 to a new location. The transplanting was fatal to many of them.

This spring two trees of cross-bred seedling No. 96 ; 5 trees of No. 95 ; 1 tree of No. 51 ; and 1 tree of No. 529 were alive.

Of the six each of the five varieties of hybrid crabs produced at the Central Experimental Farm, sent as root grafts, and planted in the spring of 1900, only 1 Progress, 4 Charles, 1 Prairie Gem, and 1 Novelty, survived.

These trees are now, however, well established, and will probably make rapid progress next season.

A large number of cross-breds, seedlings of cross-breds, with other seedling Pyrus trees were received from the Central Experimental Farm last spring. Some of these were planted in a new orchard and others were put temporarily in nursery rows to be planted out later.

NEW PYRUS ORCHARD.

A new Pyrus orchard was commenced this year, south of the Superintendent's house, in a plot well sheltered on all sides by hedges, in which the following were set :—

SEEDLINGS.

Two No. 171 ; 3 No. 167 ; 1 No. 198 ; 1 No. 162 ; 1 No. 30 ; 1 No. 107 ; 4 No. 165 ; 1 No. 142 ; 1 No. 161 ; 1 No. 192 ; 1 No. 184 ; 1 No. 183 ; 2 No. 193 ; 4 No. 175 ; 4 No. 520 ; 1 No. 19 ; 2 No. 142 ; 1 No. 79 ; 1 No. 12 ; 1 No. 45 ; 2 No. 116 ; 1 No. 132 ; 1 Eastman ; 1 Aurora ; 2 Cavan ; 2 Belmont ; 6 Rupert ; 4 Hunter, and 1 Carleton.

The following were also set out to the south of the old Pyrus orchard. Unless otherwise marked, all there were sent from the Central Experimental Farm :—

4 seedlings of *Pyrus baccata edulis*.
3 *Pyrus baccata* x Krimskoe.
4 ″ x Ball's winter crab.
2 ″ x Pewaukee.
4 seedlings of Hunter.
10 ″ Progress.
6 ″ Hyslop Crab. (From Stevenson.)
2 ″ Sweet Russet Hybrid. (From Stevenson).
7 ″ Eastman.
8 ″ Pauline.
9 ″ Charles.
4 ″ Belmont.
12 ″ Prairie Gem.
12 ″ Dean.
6 ″ Transcendent Crab. (From Stevenson).
1 ″ Virginia Crab. ″
5 ″ Minnesota Hybrid. ″
6 ″ Novelty.
4 ″ Eaton.
8 ″ Cavan.
4 Rupert hybrid sand cherry.

5 Row 13, No. 1.
6 Seedlings of Aurora.
6 Row 6, No. 1.
4 *Pyrus prunifolia fructu coccinea*.
4 *Pyrus Sieboldii*. (1850).
4 *Pyrus Malus, A. A.*
5 seedlings of *Pyrus Malus pendula, A. A.*
3 ″ Philip's sweet crab. (Stevenson).
4 *Pyrus betulæfolia*.
4 ″ *baccata, A. A.*, 139.
4 ″ ″ *orthocarpa*.
4 ″ ″ *var*.
4 ″ ″ *oblonga, A. A.*
4 ″ ″ late keeping variety.
4 ″ ″ (2550).
4 ″ ″ *flava*.
4 ″ ″ *spectabilis floridus*.
4 ″ ″ *sanguinea*.
4 ″ ″ *spectabilis var*, 1615.
4 ″ ″ ″ *A. A.*
5 ″ *prunifolia, var*, 139.

Most of these are doing well.

PLUMS.

The crop of plums was the heaviest so far grown on the Farm. In many cases the branches had to be propped up to prevent breaking from the weight of fruit, and in some instances even this did not save them.

Sixty per cent of the fruit ripened before frost came. The Aikin plum which was so early in 1900, was again the first to ripen ; but did not prove to be of first-class quality, the fruit being soft and rather tasteless.

Seedlings of Hungarian—Planted 1894.—Came through the winter in good condition. Eleven trees blossomed for the first time, May 19, and set a heavy crop of fruit. Only three trees ripened before the heavy frost on September 17, and it is feared that these are too late to be valuable for the Territories.

Notes.—Row 2, No. 6—Ripe September 15 ; medium crop ; small, yellow, acid.

Row 4, No. 4—Ripe September 13 ; light crop ; medium size ; yellow, of good flavour, but coarse in texture.

Row 4, No. 5—Ripe September 15 ; a light crop ; size, medium ; yellow ; of excellent flavour and texture.

Seedling of Speer—Planted 1895.—Wintered in good condition. Blossomed lightly on May 17, and fruited lightly for the first time. There was no fruit ripe on this tree on September 17.

Seedling of De Soto—Planted 1895.—This wintered in good condition, and blossomed and fruited heavily. The fruit was of good quality and flavour. Ripe September 13.

Seedlings of Weaver—Planted 1894.—Wintered in good condition and came in bloom May 20. Fifty-one trees fruited, and on the whole the crop was an excellent one. The fruit was generally a little later in ripening than the Manitoba Native Plums, but that on 27 trees was ripe and pulled before the frost came on September 17; on twelve others nearly ripe and picked on the 16th ; consequently there was a large proportion of the fruit secured in good condition.

About 25 per cent of the trees produced fruit of good size and excellent quality and flavour. Fifty per cent were of medium size, generally thicker in the skin, but of good flavour and texture ; and the balance were small and of poorer quality, although there were exceptions in all the cases.

The following notes on individual trees are chosen as being fairly representative of the three classes:—

Large Sized Sorts.

Row 1, No. 4.—Ripe September 10. A heavy crop of large, fine fruit ; yellow sweet, juicy, with a thin skin.

Row 1, No. 16.—Ripe September 12. A heavy crop, large, pear-shaped, yellow, red on the sunny side, juicy, and of very fine flavour and texture. Skin, medium. Probably the best plum grown on the Farm this year.

Medium Sized Sorts.

Row 4, No. 15.—Ripe September 15. A heavy crop of medium sized fruit, yellow, juicy, slightly acid, but of good quality ; skin medium.

Row 2, No. 6.—Ripe September 17. A medium crop : fruit of medium size, yellow and red, juicy, good flavour, sweet ; skin of medium thickness.

Small Varieties.

Row 2, No. 17.—Ripe September 15. A medium crop ; fruit of small size, yellow, and of fair flavour and texture ; thick skin and very small stone.

Aikin Plum.—Planted 1897.—Wintered in good condition. Blossomed May 15. Ripe September 1.

Considering the size of the tree, the crop was a heavy one, and it attracted a great deal of attention during the latter part of the season. Although the Aikin may not be of quite as fine flavour as some of the Weaver seedlings, it is as large and ripens a few days earlier, which would be very much in its favour in a short season.

This variety is undoubtedly a valuable one for the Territories ; and all the pits have been preserved for planting.

Rollingston seedling—Planted 1897.—Blossomed lightly May 17.Produced a light crop of small, red fruit, which did not ripen before frost.

MANITOBA NATIVE PLUMS.

(From Thos. Frankland, Stonewall, Manitoba.)

Wintered in good condition and came in bloom May 17. Crop good.

A considerable quantity of the crop of fruit ripened this year was sold for preserving or canning and samples were sent to different parts of the Territories.

It is gratifying to know that some of the seedling plums distributed to settlers during the past six years are now bearing fruit ; several samples having been, very kindly, sent in by the growers.

PLUM TREES RECEIVED FROM CHAS. LUEDLOFF, COLOGNE, MINN., U.S.A.

Planted 1896.—Came through the winter in good condition and blossomed on May 20.

Name.	Crop.	Size.	Colour.	Texture.	Flavour.	Date ripe.
Charles Downing	Light	Large	Yellow	Coarse	Excellent	Sept. 6
Reed	Heavy	"	"	Good	Good	" 6
City	Medium	Medium	"	"	"	" 8
Caylord	Heavy	"	Red	"	Excellent.	" 10
Crescent City	"	Large	Yellow	Coarse	Good	" 10
Weaver	"	Medium	"	"	Medium	" 10
New Ulm	Light.	Large	"	Good	Excellent	" 10
Van Deman	Medium	Medium	"	"	Good	" 10
Milton	Heavy	Small.	"	Medium	Excellent	" 10
Anthony	Light	"	Red			Frozen.
Irene	"	"	Yellow			"
Deep Creek	Heavy	Medium	"			"
"	"	"	"	Coarse	Medium	Sept. 13
Purple Yosemite	Medium	"	"			Frozen
Cottrell	Heavy	"	"	Good	Excellent	Sept. 14
"	Light.	Large	"	"	"	" 15
Weaver	Medium	"	"	"	Good	" 13
Van Buren	Light	Small	"			Frozen
Newman	Heavy	Medium				"
Dr. Dennis	Light	Large				"
Yellow Sweet	"	"	Yellow	Good	Good	Sept. 16
Ocheeda	Heavy	"	"	"	Excellent.	" 13
Col. Wilder	Light	Small	Red	"	"	" 13
American Eagle	Heavy	Medium	"	"	Good.	" 15
De Soto	Medium	Large	Yellow	"	Excellent	" 15
Crescent City.	Heavy	"	"	"	"	" 13
Neil's	"	Small	"	"		Frozen.
Wood	Light	"	"			"
Dunlap No. 1	Heavy	Medium	"	Medium		"
Peffer's Premium	"	Small	"			"
Large Red Sweet	"	"	Red	Good	Excellent	Sept. 13
Hammer	Light	Medium	Yellow			Frozen.
"	Medium	"	"	Medium	Medium	Sept. 15
Silas Wilson	Light	Large	"			Frozen.
City	Heavy	Small	Red	Medium	Good	Sept. 13
Riehland	"	Medium	Yellow	Coarse	Medium	" 15

CHERRIES.

Seedling of Carnation —Planted 1894.—Wintered in good condition. Made strong growth, but did not fruit.

Seedling of Lithaur Weichsel—Planted 1894.—Wintered in good condition. Made strong growth during the season, but did not fruit.

Seedling of Olivet —Planted 1895.—One tree winter-killed to ground and was taken up and destroyed; the other came out in good condition and made fair growth.

Mahaleb.—Planted 1895.—One tree was killed slightly at tips; the other wintered in good condition. Did not blossom.

Seedling of Wild Cherry from Nebraska.—Planted 1896.—Apparently now quite hardy. Blossomed and fruited lightly. Fruit like Prunus Demissa, but larger.

Rocky Mountain Cherry.—Planted 1895.—Hardy. Fruited heavily, but fruit is small and too late.

Prunus Pumila.—Hardy. Medium crop of fairly good fruit.

SMALL FRUITS.

The crop of small fruits, with the exception of Black Currants and Strawberries, was above the average; and some excellent fruit was secured.

Rust struck the currants, but as the fruit was well formed, little or no damage was done.

WHITE CURRANTS.

White Grape, White Dutch, White Transparent and White Imperial were under test. All were hardy, made strong growth and produced excellent crops of fruit.

RED CURRANTS.

Fay's Prolific, Raby Castle, Red Dutch, La Conde, Knight's Early Red, New Red Dutch, Native Red, London Red, Victoria, Fertile d'Angers, Cherry, Prince Albert. La Fertile, Versailles, North Star, Pomona and Wilder, under test. Came through the winter in good condition. A large crop of fruit set, which ripened rather unevenly, but on the whole the crop was above the average.

BLACK CURRANTS.

Lee's Prolific, Black Naples, Prince of Wales, Crandall, and the following of Saunders' Seedlings, Stewart, Orton, Clipper, Kerry, Eagle, Monarch, Charmer, Beauty, Winona, Ontario, Standard, Lewis, Ethel, Stirling, Star, Madoc, Perry, Eclipse, Oxford, Climax, all wintered in good condition and made very strong growth. A very light crop of fruit set, but any that matured was of superior size and quality.

RASPBERRIES.

Dr. Reider, Philadelphia, Turner, Caroline, Lady Anne, Garfield, Miller's Red and Kenyon came out of winter covering in good condition and blossomed very freely. The crop was fair. The fruit of Dr. Reider, Miller's Red and Philadelphia was very large and of excellent quality.

GOOSEBERRIES.

Smith's Improved, Lancashire Lad, Governess, Columbus, Houghton, Native, Pearl and Keepsake, under test. All are quite hardy. Made strong growth and produced a medium crop, giving fruit of good size and quality.

STRAWBERRIES.

Capt. Jack, New Dominion, Windsor Chief and Pineapple, under test. On account of the very dry weather during the first two weeks in June, the crop was almost a total failure. Fruit small and inferior.

SUMMER-FALLOWS.

It is very gratifying to know that throughout the Territories, summer-fallowing is rapidly becoming general. No matter where farming is carried on, the farmers realize that to be sure of a crop they must prepare a portion of their land the year before the crop is grown, and apart from the value of the stored moisture, there is the inestimable advantage of keeping weeds from over-running the farm.

The true worth of properly prepared fallows was clearly demonstrated in the season of 1900 in every grain-growing district of Assiniboia, and although the season just past has been an extraordinary one, the crops grown on fallows were, in every case, the heaviest producers.

The work of preparing land for crop by fallowing is carried on in so many ways in different parts of the Territories, that perhaps a few words on one of the methods employed may be of help to at least some of the new settlers.

It has been observed in Alberta and Saskatchewan that the land to be fallowed is not, as a rule, touched until the weeds are full-grown and in many cases, bearing fully matured seed. It is then ploughed.

By this method, which, no doubt, saves work at the time, the very object of a summer-fallow is defeated. In the first place, moisture is not conserved because the land has been pumped dry by the heavy growth of weeds; and, secondly, instead of using the summer-fallow as a means of eradicating weeds, a foundation is laid for years of labour and expense by the myriads of foul seeds turned under.

The endless fields of yellow-flowered weeds, generally Ball Mustard (*Neslia paniculata*), testify to the indifferent work done in many districts, and while no weed is more easily eradicated by a good system of fallows, there is no weed that is more easily propagated or takes greater advantage of poor work on fallows or of fall or spring cultivation.

As has been pointed out in my previous reports, early and thorough work on fallows is absolutely necessary to success, and I here repeat the methods and results of tests carried on for some years past.

First Method.—Ploughed deep (6 to 8 inches) before last of June; surface cultivated during the growing season, and just before or immediately after harvest ploughed 5 or 6 inches deep.

Result.—Too much late growth if season was at all wet; grain late in ripening, and a large crop of weeds if the grain was in any way injured by winds.

Second Method.—Ploughed shallow (3 inches deep)) before the last of June ; surface cultivated during the growing season, and ploughed shallow (3 to 4 inches deep) in the autumn.

Result.—Poor crop in a dry year ; medium crop in a wet year. Not sufficiently stirred to enable soil to retain the moisture.

Third Method.—Ploughed shallow (3 inches) before the last of June; surface cultivated during the growing season, and ploughed deep (7 to 8 inches) in the autumn.

Result.—Soil too loose and does not retain moisture. Crop light and weedy in a dry year.

Fourth Method.—Ploughed deep (7 to 8 inches) before the last of June ; surface cultivated during the growing season.

Result.—Sufficient moisture conserved for a dry year, and not too much for a wet one. Few or no weeds, as all the seeds near the surface have germinated and been killed. Surface soil apt to blow more readily than when either of the other methods is followed. For the past fourteen years, the best, safest and cleanest grain has been grown on fallow worked in this way, and the method is therefore recommended.

Fallows that have been ploughed for the first time after the first of July, and especially after July 15, have never given good results ; and the plan too frequently followed of waiting till weeds are full grown, and often ripe, and ploughed under with the idea of enriching the soil, is a method that cannot be too earnestly advised against.

In the first place, after the rains are over in June or early in July, as they usually are, no amount of work, whether deep or shallow ploughing, or surface cultivation, can put moisture in the soil. The rain must fall on the first ploughing and be conserved by surface cultivation.

Weeds, when allowed to attain their full growth, take from the soil all the moisture put there by the June rains, and ploughing under weeds with their seeds ripe or nearly so, is adding a thousand-fold to the myriads already in the soil, and does not materially enrich the land.

BREAKING AND BACK-SETTING.

In view of the fact that every year brings to the Territories, many new settlers who are unacquainted with the methods of breaking up and preparing new land for crop, a few suggestions with regard to this very important work may not be amiss.

In all sections where the sod is thick and tough, breaking and back-setting should be done ; while in districts where scrub abounds and the sod is thin, deep breaking is all that is necessary.

The former is generally applicable to Assiniboia, and the latter to Alberta and Saskatchewan, especially to the northern parts of these Territories where the land is more or less scrubby.

SHALLOW BREAKING.

(To be back-set).

The sod should be turned over as thin as possible, and for this purpose a walking plough with a 12 or 14 inch share, is the best. When the breaking is completed (which should not be later than the second week in July), rolling will hasten the rotting process and permit back-setting to commence early in August.

BACK-SETTING.

Back-setting is merely turning the sod back to its original place, and at the same time bringing up two or three inches of fresh soil to cover it. The ploughing should be done in the same direction as the breaking and the same width of furrow turned. Two inches below the breaking is considered deep enough but three or four inches will give better results.

After back-setting, the soil cannot be made too fine and the use of disc or Randall harrow to cut up every piece of unrotted sod, will complete the work.

DEEP BREAKING.

Deep breaking, which in many sections of the country is the only practicable way of preparing new land, and which is, unfortunately, done in some instances where

breaking and back-setting would give more satisfactory results, consists in the turning over of the sod as deep as possible ; usually from 4 to 5 inches.

When the sod has rotted, the top-soil should be worked and made as fine as possible. The use of harrow or disc will fill up all irregularities on the surface, and make a fine, even seed bed.

Whether the land is broken shallow or deep, it is necessary to have the work completed early, so as to take advantage of the rains which usually come during June or early in July. These rains cause the sod to rot, and without them or if the ploughing is done after they are over, the sod remains in the same condition as when turned, and no amount of work will make up for the loss.

To some districts near the foot-hills of the mountains and in districts where scrub abounds, and the sod is thin, these remarks may not apply, but, as a rule, throughout the Territories, early breaking, whether deep or shallow, is advisable.

WORKING LAND AFTER FIRST CROP.

Inquiries are often made as to what should be done after taking off the first crop on new land, the principal being as to whether the land should be ploughed, or cultivated, or sown without any cultivation whatever.

This, however, can only be determined by circumstances. In districts with heavy clay soil, a satisfactory crop may be expected from burning the stubble of the former crop and sowing with or without cultivation ; although a shallow cultivation after the stubble is burnt usually gives the best results.

In districts with light soils and especially with gravelly subsoil, cultivation before seeding is necessary.

After taking the second crop from breaking or back-setting, there can be no doubt that the land should be well fallowed to put it in proper condition for succeeding crops. If the fallow is well made and the process is repeated every third year, the settler will have started on the right road to future success.

CATTLE.

The herd of pure-bred cattle on the Farm is growing slowly and needs new blood to improve its quality.

When the Holsteins were dispensed with there were only six pure-bred Short-horn females on the Farm, and from these the increase has been very slow, from the fact that the calves have been nearly all males, which have been sold or sent to other Experimental Farms.

At present the herd consists of thirteen pure-bred Short-horn females and four bulls, and one bull each of the Guernsey and Ayrshire breeds. There are also eighteen grades.

A few first-class Short-horn females are greatly needed to keep the herd on the Farm up to the requirements of the country.

Fifteen Short-horn grade steers have been purchased this fall for use in a feeding test which will be carried on during the winter.

Since last report, the following pure-bred male has been sold for breeding purpose: Short-horn 'Strathcona,' to A. Isbister, Fort Qu'Appelle.

TEST OF DEHORNING STEERS.

During the autumn of 1900, fifteen 3-year-old steers were obtained from ranchers in the vicinity of Indian Head for use in the test of the practicability of dehorning.

On November 27, after a preparatory feeding of forty-two days, a sixteen weeks' test was commenced to determine :

1st. What loss, if any, is occasioned by the process of dehorning, and

2nd. If feeding loose in a box-stall, rendered possible by dehorning, has any advantage over stall-feeding.

On the above date, the fifteen animals were divided into three lots of approximately equal weight :—

Lot No. 1. Five steers, left in a natural state and tied up.

Lot No. 2. Five steers, dehorned (by sawing off horns with a small hand-saw) and tied up, and

Lot No. 3. Five steers, dehorned (by the same method as above) and put in a loose box.

The three lots received a uniform ration throughout the test, which consisted of :—

During the first four weeks, each animal per day—

	Pounds.
Ensilage (made from green oats)	16
Straw (wheat)	12
Meal	4

During second four weeks, each animal per day—

	Pounds.
Ensilage (made from green oats)	16
Straw (wheat)	12
Meal	8

During third four weeks, each animal per day—

	Pounds.
Ensilage (corn)	16
Straw (barley and oat)	12
Meal	10

During fourth four weeks, each animal per day—

	Pounds.
Ensilage (corn)	16
Straw (barley and oat)	12
Meal	12

The straw was cut and the meal consisted of two parts of ground barley to one part of ground wheat. The steers were fed three times daily, and watered twice.

For a few days after the operation, no effect of the dehorning was noticeable on the animals; but after that time they all went off their feed and for about a week were apparently very sick. The recovery, however, was rapid.

Following will be found a statement of the monthly and total weights and gains of each lot of steers during the period of the test ; weights and gains made by the bunch during the whole period (October 15 to May 10; the total amount and estimated value of feed consumed during the same time, and a summary of the financial results of the transaction : —

Monthly and total weights and gains of each lot of steers during the period of test.

Lot.	Weight at Start of Test.	1st Four Weeks.		2nd Four Weeks.		3rd Four Weeks.		4th Four Weeks.		Total Gain.
		Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	Weight.	Gain.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
No. 1	6,390	6,440	50	6,780	340	6,960	180	7,180	220	790
" 2	6,400	6,200	Loss 200	6,470	270	6,700	230	7,000	300	600
" 3	6,400	6,460	Gain 60	6,900	440	7,120	220	7,490	370	1,090

Total weight and gain made during the whole period—October 15 to May 10.

Lot.	Weight when bought October 15.	*Weight when sold May 10.	Gain.
	Lbs.	Lbs.	Lbs.
No. 1	6,260	7,380	1,120
No. 2	6,290	7,300	1,010
No. 3	6,180	7,640	1,460
Total	18,730	*22,320	3,590

*Less 5 per cent shrinkage, 21,204 pounds.

Total weight and estimated value of feed consumed during the whole period—October 15 to May 10.

Preparatory feeding, each lot (5 steers) 42 days—

Ensilage, 16 lbs. per day, 3,366 lbs. at \$2 per ton	3 36
Straw, 12 lbs. per day, 2,520 lbs. at \$1 per ton	1 26
Meal, 4 lbs. per day, 840 lbs., at $\frac{2}{3}$ cent per lb.	5 60
	\$10 22

Or for the three lots, \$30.66.

During test (112 days), each lot—

Ensilage, 8,960 lbs. at \$2 per ton	\$ 8 96
Straw, 6,720 lbs. at \$1 per ton	3 36
Meal, 4,760 lbs. at $\frac{2}{3}$ cent per lb.	31 73
	\$44 05

Or for the three lots, \$132.15.

From end of test till sold (51 days), each lot—

Ensilage, 16 lbs. per day, 4,080 lbs. at \$2 per ton	\$ 4 08
Straw, 12 lbs. per day, 3,060 lbs. at \$1 per ton	1 53
Meal, 12 lbs. per day, 3,060 lbs. at $\frac{2}{3}$ cent per lb.	20 40
Oil-cake, $\frac{1}{2}$ lb. per day, 127$\frac{1}{2}$ lbs. at 3$\frac{1}{2}$ cents per lb.	4 45
	\$30 46

Or for the three lots, \$91.38.

Summary of cost of feeding—

During preparatory feeding	$ 30 66
During test	132 15
Till sold	91 38
	$254 19

Or for each steer, $16.94.
Or for each lot of five steers, $84.73.

SUMMARY of Financial result of the Transaction.

Lot.	Weight bought.	At	Amount paid.	Add Cost of Feed.	Total cost.	Weight sold.	At.	Amount received.	Gain, each Lot	Gain per Head.
	Lbs.	Cts.	$ cts.	$ cts.	$ cts.	Lbs.	$ cts.	$ cts.	$ cts.	$ cts.
No. 1	6,260	3	187 80	84 73	272 53	7,011	4 60	322 50	49 97	9 99
No. 2	6,290	3	188 70	84 73	273 43	6,935	4 60	319 02	45 59	9 11
No. 3	6,180	3	185 40	84 73	270 13	7,258	4 60	333 86	63 73	12 74
Total . .	18,730	3	561 90	254 19	816 09	21,204	4 60	975 38	159 28	*

* Or an average net gain of $10.62 per head.

SWINE.

There are at present, three breeds kept on the Farm, namely, Berkshire, Tamworth and Yorkshire White.

A pair of Yorkshire Whites and a young Tamworth boar were received from the Central Experimental Farm in June last.

The young animals from any of the above mentioned breeds find ready sale, and with the high price of pork there is no better paying business in the country than hog-raising ; although at present very few are engaged in the work.

POULTRY.

Two breeds, Black Minorcas and White Wyandottes, have been kept the past year. The former has given the better returns both in eggs and chickens, and, in fact, for some years has proved the most satisfactory breed to keep.

The only objection to Black Minorcas is their comb, which, however, cannot be considered a detriment where fairly comfortable quarters are provided for the winter months.

HORSES.

There are at present thirteen horses on the Farm. Two of these were brought up when the Farm was started, nearly fifteen years ago, and they are becoming almost too old for work. Two others, obtained later, are also showing signs of giving out.

INSTITUTE MEETINGS.

During the past year, meetings arranged by the Department of Agriculture of the North-west Government, in Southern and Northern Alberta and in the South-eastern portion of Assiniboia, have been attended.

In February, in company with Mr. J. H. Grisdale, Agriculturist of the Central Experimental Farm, Ottawa, and Mr. George Lang, of Indian Head, a most interesting trip was taken in Southern Alberta, when Lethbridge, Magrath, Cardston, Mountain View, Fishburn and Pincher Creek were visited.

At Lethbridge, small-pox had unfortunately broken out and a public meeting could not be held, but a number of leading citizens met in the Town Hall and the matter of tree-planting was fully discussed. From the fact that irrigation had lately become available at Lethbridge, tree-planting was a very live question and was gone into in all its details.

At Magrath, a new Mormon settlement between Cardston and Lethbridge, on the line of the Irrigation canal, two very large and interesting meetings were held. As all the settlers in this neighbourhood had lately arrived from Utah, U.S.A., and were unacquainted with the methods of farming in the Canadian North-west, very close attention was paid to all that was said at both meetings. Fall wheat had been sown the previous fall on new breaking, and at the time of our visit was not discernable above ground ; although the return proved highly satisfactory, the yields are said to have varied from 40 to 50 bushels per acre.

At Cardston two meetings were held ; the one in the afternoon being very large and interesting. In the evening however, a Mormon wedding in the town proved too strong a counter attraction.

The meetings at Mountain View, Fishburn and Pincher Creek, all of which are in the foot-hills of the Rocky Mountains, were well attended.

At all the meetings Mr. Grisdale spoke on Live Stock, Mr. Lang on Tree Culture, while I paid particular attention to the cultivation of the soil for grain and hay.

On returning from Alberta, a series of meetings was attended in company with Mr. George Harcourt of the *Nor'-west Farmer*, Winnipeg, in South-eastern and Eastern Assiniboia, the following towns being visited :—Weyburn, a new settlement on the Soo line of railway ; Gainsboro, Elmore, Carnduff, Carlyle, Cannington Manor, Glen Adelaide, Fleming and Moosomin. At the two latter places Mr. D. Anderson, an Institute worker from the province of Ontario, joined us and addressed the meetings. All the meetings were well attended, especially good gatherings being present at Weyburn, Elmore and Carnduff. Mr. Harcourt spoke on Live Stock, and I spoke on Grain, Grasses and Tree Culture.

During July I accompanied Dr. Jas. Fletcher, Entomologist and Botanist of the Experimental Farms, at a series of meetings in Northern Alberta, and with us at different places were Mr. Marker, Superintendent, of Dairies for Alberta ; Mr. W. N Willing, Territorial Weed Inspector, and Mr. Blakely of the Nor'-West Farmer Winnipeg.

Olds, Innisfail, Red Deer, Strathcona, Clover Bar, Fort Saskatchewan, Leduc Wetaskiwin, Ponoka and Lacombe were visited and meetings held. At that time the weather and roads were very bad, the latter in some places being almost impassable, so that the attendance on the whole was not large. As these meetings were called for the purpose of discussing weeds and their eradication, Dr. Fletcher was the chief speaker and went into the matter most thoroughly.

DISTRIBUTION OF SAMPLES.

During the months of March, April and May, the following distribution of samples was made to applicants throughout the Territories of Assiniboia, Alberta and Saskatchewan.

The number of applicants was, as usual, largely in excess of the supply of material available for this purpose ; and the stock of seedling trees and shrubs, cuttings of fruit bushes, rhubarb roots and tree seeds grown for this purpose did not begin to fill all the requests received.

Besides the seedlings mentioned below, many thousands of maple trees, from 3 to 5 feet in height, were given to settlers in the districts surrounding the Farm.

Grain.—Wheat, 252 bags, 3 pounds each.
" Oats, 414 bags, 3 pounds each.
" Barley, 68 bags, 3 pounds each.
" Pease, 200 bags, 3 pounds each.
" Sundries, 43 bags, 3 pounds each.
Potatoes, 652 bags, 3 pounds each.
Tree-seeds, Maple, 607 bags, 1 pound each.
Grass-seed, Brome, 261 bags, 1 pound each.
Grass-seed, Western Rye grass, 18 bags, 1 pound each.
Small-seeds, 705 packages, containing 7,986 pa. shrub-seeds, flower-seeds, root-seeds, garden-seeds and corn.
Fruit-bushes, 145 packages.
Tree and shrub seedlings, 217 packages.
Fruit bushes and tree and shrub seedlings, 146 packages.
Rhubarb roots, 98 packages.
Express packages, 43, containing maple trees, 755 ; elm, 140 ; artemisia, 1,000 ; seedling plums, 190 ; sundry shrubs, 900.

CORRESPONDENCE.

During the twelve months ending October 31, 1901, 5,410 letters were received, and 5,333 mailed from this office. In letters received, circular reports on grain and other samples are not counted, and in letters mailed, circulars of instruction sent with grain and other samples are not included.

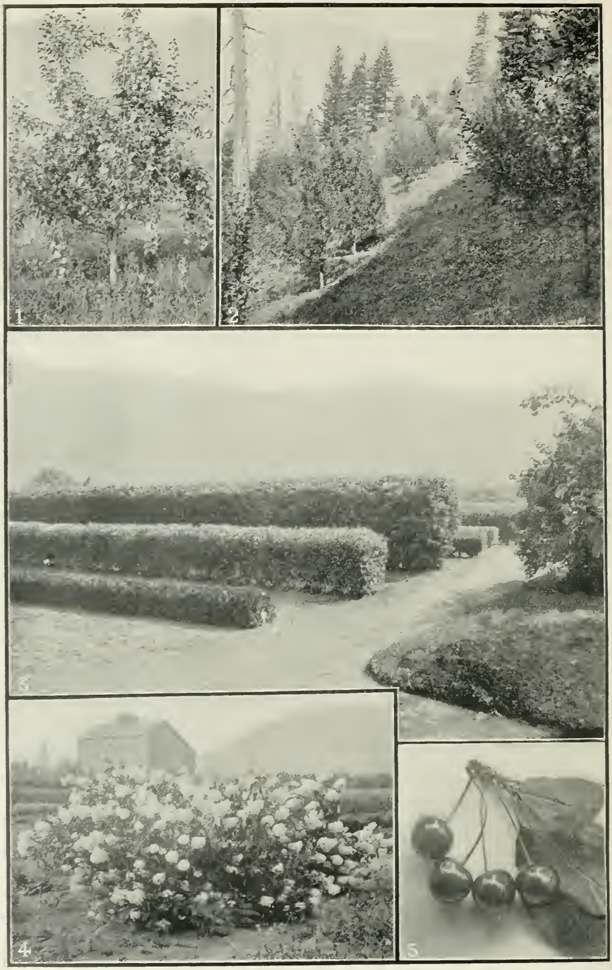
METEOROLOGICAL OBSERVATIONS.

Month.	Highest Temperature.		Lowest Temperature.		Snow-fall.	Rainfall.		Hours of Sun-shine.
	On	Degrees	On	Degrees	Inches.	No. of Days.	Inches.	
1900.								
November	1	52	20	−28	10	....	....	52·6
December	17	38	31	−32	8	....	....	42·2
1901.								
January	13	35	1	−37	15	....	....	59·6
February	28	40	4	−29	3	....	....	107·7
March	1	42	4	−20	2	....	....	124·6
April	30	79	17	−9	17	7	1·43	139·3
May	17	95	6	28	....	2	·87	293·8
June	1	80	7	31	....	12	5·62	144·5
July	12	89	2	44	....	10	5·82	222·9
August	26	91	8	36	....	0	·0	230·5
September	2	81	28	22	25	6	4·9	80·5
October	20	75	31	15	....	1	1·58	159·0
					80	38	20·22	1657·2

NOTE.—The rainfall in April and September includes melted snow.

I have the honour to be, sir,
Your obedient servant,

ANGUS MACKAY,
Superintendent.



Scenes on Experimental Farm, Agassiz, B.C.

1. Apple tree in fruit. 2. Part of Orchard on side of mountain. 3. Hedges. 4. Hydrangea paniculata. 5. Cluster of cherries.

EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

REPORT OF THOMAS A. SHARPE, SUPERINTENDENT.

Agassiz, B.C., Nov. 30, 1901.

To Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour herewith to submit my report of the experiments carried on and progress of the general work of the Experimental Farm for the year 1901.

The season has been on the whole a favourable one for hay, grain and root crops, but unfavourable for fruits. January was rather stormy, alternating between snow, and rain, the year opening with snow on the ground, and there were several falls agregating nineteen inches, which lay until the 11th, when it began to rain. From then to the end of the month there was a little over five inches, but it was never very cold, the lowest temperature being on the 9th, when it reached 11 degrees above zero. February was milder, and fairer, the rainfall being only 2¾ inches, and the snowfall 7 inches, the lowest temperature was on the fifth when it registered 16 above zero. March was milder, 6 degrees of frost on the 24th being the lowest point reached, but there were seventeen rainy days, and the rains were cold, and very disagreeable. Peach, apricot, nectarine, almond, and early blossoming plums were in bloom in the last few days of the month, and the last 8 days of the month were stormy, which was injurious to the fruit blossoms.

April opened with a fall of two inches of snow, followed by rain storms up to the 5th when there was another snowfall of two inches, and the month continued cold and wet, there being fourteen rainy days with the prevailing winds from the north, north-east and north-west, with light frosts on a number of mornings. On the 18th the temperature fell to 28 which was disastrous to the fruit crop generally. May continued cool, and rather wet with rain storms on thirteen days and the wind mostly from the north. June began with rain on the first nine days, and cool westerly, and north-westerly winds, rain fell on 21 days, there were only 80 hours of sunshine in this month. Under these conditions, it was almost impossible to cure clover hay, and growth up to the end of this month was backward.

July was fine, clear and bright, there being only seven showery days with a rainfall for the month of 1¼ inches. August was dry and warm throughout, it being the first month since the meteorological records have been kept at this station, that there was no rain to record, and only a few cloudy days. September was another beautiful month, with about 1½ inches of rain, and the lowest temperature recorded was 35 on the 28th. There were a few light showers on the 10, 11, 12, and 13th of October, and bright warm days up to the latter part of the month when it began to rain and rained pretty steadily up to the close of the month.

The first frost of the season came on November 11, up to which time it had rained very frequently from the first.

The rainfall as a whole has been much the lightest for some years, but the number of rainy days in the winter and spring months has been greater than usual, especially in the months of April, May and June, and as the prevailing winds in those months were from a northerly direction, they were usually cool months, and unfavourable for the growth of fruits.

In July a new circular silo 15 feet in diameter and 30 feet deep was put up in the barn, and is now nearly filled with corn. The old silo which was put in when the barn was built had decayed on the inside, and was no longer fit for service.

THE FRUIT CROP.

The fruit crop has been a poor one owing to the very unfavourable spring weather, and as a result few trees set fruit, and the continued rains in May and June prevented effective spraying and in consequence scab on apples and brown rot of the cherry and plum, seriously damaged what fruit did set.

HEDGES.

The sample hedges have made satisfactory growth and are very much admired, and of great interest to visitors to the Farm, and many examine them with a view to a selection for their own places.

FOREST AND TIMBER TREES.

The forest trees planted in the shelter belt continue to make vigorous growth, and the nut and timber trees planted on the mountain sides are making fair progress.

ORNAMENTAL SHRUBS AND TREES.

The ornamental shrubs and trees have done well this season, having made a fine growth, and the flowering shrubs and trees have been very beautiful with a wealth of bloom from early spring, beginning with the Forsythias early in March, and ending with the Japan Hydrangeas which are still in bloom.

NUT TREES.

The English, Japanese, American and Heart-shaped walnuts all fruited this year. The Spanish and Japan chestnut trees also produced a few nuts. The crop of filberts was as usual a very poor one and the blue jays carried off many of the nuts before they were fully ripe. Owing to the poor cropping of the filberts and the depredations of the blue jays, which are very plentiful in most districts, it is not at all likely to become a popular bush to plant.

Most of the nuts saved have been distributed to farmers who want to try a few trees on their own farms.

The hardshell almonds did not fruit this year, and the soft-shell varieties, although most of them are fairly large trees, have never borne fruit and may be regarded as useless in this climate.

DITCHING.

The ditch mentioned in my last report has been extended 720 yards further, and the part previously dug has been deepened and widened.

Part of the ditch dug this year was very difficult as owing to ridges to be cut through between sloughs it was in some places over 8 feet wide on top and more than that deep, these deep places are being boxed with 2-in. fir plank and will be filled in.

This was necessary on account of the inconvenience of so deep and wide an open ditch and the trouble in keeping it open on account of the sides caving in.

The ditch has already done good service and land that in some places was formerly covered with water all the year was firm and solid this autumn and will be fit for cultivation in another year.

CLEARING.

About fifteen acres have been cleared of brush and timber and seeded to clover and orchard grass. A very fair catch has been obtained and it will make considerable pasture next season. About 1,200 yards of wire fencing was put up last spring enclosing the new land, and a piece of bush which it is intended to clear in the same way.

LIVE STOCK.

The cattle bought last year for feeding were sold during the winter and spring, except three head, a grade milk cow and two young steers. The young shorthorn bull then on the Farm has been sold and a fine young one sent from Ontario in his stead. At the same time fourteen registered shorthorn heifers were sent out, six of these were forwarded to the British Columbia Dairymen's Association's sale at Victoria and sold, leaving at present on the Farm fourteen pure bred shorthorns and four grades.

SHEEP.

Since my last report a Dorset ram has been added to the stock and one young ram sold, and we have now nine ewes and one ram.

PIGS.

The stock of pigs at present consists of one pure bred Berkshire boar, one Berkshire sow and six young pigs. Two Tamworth sows and eight young pigs and four cross-bred pigs. There is more call for pure Tamworth stock now than at any previous time, and wherever they are introduced they are well thought of.

BEES.

The bees did not winter well and two feeble swarms were all that came through. A new queen was got for these in the spring and the two colonies united. This gave three swarms, and we have now four colonies that are well supplied with honey and should go through the winter in good condition.

POULTRY.

There are five breeds of poultry on the farm: Light Brahmas, White Wyandottes, Silver Laced Wyandottes, Barred Plymouth Rocks and Black Minorcas.

All the poultry are healthy and thrifty, and the chickens strong.

A Cyphers incubator was procured last April of 120 egg capacity. By the first hatch we had 65 strong chickens out of 88 fertile eggs. The incubator was filled again, and out of 95 fertile eggs there were hatched 50 chickens.

The Minorcas prove the best layers here and their eggs are large, but the chickens are rather delicate and difficult to raise as they feather so young.

The Brahmas are good layers and the chickens are hardy and easy to raise. The parent stock should be kept thrifty by having a large run, a variety of food, and change of male bird every year. It is always necessary for the heavy breeds to have a large run, otherwise their eggs will not hatch well, neither will their chickens be strong.

The Barred Plymouth Rocks have done very well ; they lay nearly as well as the Brahmas, and their eggs produce strong chickens, which matured a little earlier than the Brahmas. They make a fine lot of even looking pullets and cockerels. Only one of the B. P. Rock chickens died of illness. One B. P. Rock cockerel weighed 6 lbs. at five months old, and a Brahma cockerel of same age weighed 5¾ lbs. A Silver Laced Wyandotte and White Wyandotte cockerel weighed each 5½ lbs. at five months' old. These chickens were well cared for but were not fattened and were always at large, when the weather was dry.

The Silver Laced Wyandottes and White Wyandottes are good fowls, both for eggs and chickens, but are not quite so profitable here as the Brahmas and B. P. Rocks.

The Poultry are all allowed to run at large, except when put into pens for breeding purposes, from January 1 to July. They are comfortably housed and regularly fed, but are never forced either for fattening or for eggs.

In allowing the hens to run at large not only are they much better and healthier than when confined, but they also pick up many injurious insects on the lawn, and in the fruit orchards. When the weather is fine they go a long distance from the hen house, and are a very great benefit to the whole farm in picking up grasshoppers and other insects.

EXPERIMENTS WITH OATS.

Sixty-three varieties of oats were sown in the uniform test plots. All were sown April 18 at the rate of 2½ bushels per acre, on sandy loam which had been in pease in 1900 following clover. The size of plots was one-fortieth of an acre. There was very little rust and no smut, and the sample is a very fair one and the yield in most cases very good. The weight per bushel is obtained by weighing a half bushel of the oats as they come from the threshing machine.

Six plots were also sown with Banner Oats using different quantities of seed per acre to ascertain what effect this might have on the crop.

OATS.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre		Weight per Bushel.	Rusted.
			In.		In.		Lbs.	Bush.	Lbs.	Lbs.	
Golden Tartarian	Aug. 20	124	40	Medium	11	Sided	6,280	103	18	35¾	Slightly.
Black Beauty	" 20	124	48	Stiff	11	Branching	5,700	101	6	36¼	None.
Wide Awake	" 19	123	36	Slender.	7	"	5,560	100	..	35¼	"
Holland	" 20	124	52	Stiff	9	Sided	6,400	97	2	36	"
Buckbee's Illinois	" 20	124	48	Medium	11	Branching	6,000	95	10	35	"
Lincoln	" 16	120	48	Stiff	8	"	5,200	94	24	34½	"
Holstein Prolific	" 20	124	35	"	8	"	6,720	94	4	35	"
White Schonen	" 16	120	42	Medium	8	"	6,320	93	18	34½	"
Early Golden Prolific	" 19	123	40	"	10	"	5,200	93	8	36¼	"
Salines	" 16	120	42	"	6	"	6,200	92	32	36¼	"
Hazlett's Seizure	" 20	124	42	"	9	"	6,600	91	26	35½	"
Salzer's Big Four	" 21	125	36	"	8	"	3,600	91	26	34½	Slightly.
Cream Egyptian	" 20	124	42	Stiff	9	"	5,720	91	6	35½	"
Danish Island	" 22	126	48	"	9	"	6,440	91	6	35	None.
King	" 21	125	42	"	10	"	6,600	90	..	34¾	Slightly.
Brandon	" 16	120	36	"	8	Sided	3,400	89	14	34¾	None.
Abyssinia	" 21	125	42	Medium	9	Branching	6,400	89	4	34¾	"
Early Gothland	" 16	120	36	Stiff	9	"	5,880	89	4	36½	"
Russell	" 20	124	42	"	9	"	6,240	88	8	36	"
Master	" 22	126	40	"	10	"	6,000	87	22	35	"
Early Blossom	" 14	118	42	Medium	9	Sided	5,040	87	2	34	"
American Triumph	" 21	125	48	Stiff	8	Branching	6,080	86	26	35	"
Oderbruch	" 16	120	42	Medium	8	Sided	6,400	86	16	34	"
White Russian	" 16	120	42	Stiff	8	Branching	4,240	85	30	35	"
Olive	" 16	120	40	"	7	Sided	4,000	85	10	34	"
White Giant	" 16	120	44	"	7	"	4,480	82	12	34	"
California Prolific Black	" 19	123	42	Medium	8	"	6,400	81	26	34	Slightly.
Early Archangel	" 21	125	40	"	8	Branching	4,200	81	6	34	None.
Tartar King	" 20	124	46	Stiff	9	Sided	4,040	80	20	34½	"
Abundance	" 16	120	36	Medium	8	Branching	6,400	80	..	34	"
Oxford	" 16	120	42	"	9	"	6,200	80	..	34	"
Scotch Potato	" 20	124	40	"	9	......	5,200	78	28	34	"
Improved Ligowo	" 20	124	46	Stiff	8	Branching	4,600	78	18	35	"
New Zealand	" 16	120	38	Medium	8	Sided	4,800	78	8	34	"
Bonanza	" 21	125	42	"	9	Branching	6,200	77	22	35	"
Golden Beauty	" 21	125	48	Weak	9	"	5,600	77	22	34	"
Banner	" 14	118	44	Medium	10	"	3,360	77	12	34½	"
Prolific Black Tartarian	" 14	118	38	Weak	10	Sided	4,000	77	2	35	"
Pioneer	" 14	118	40	Medium	10	Branching	5,800	75	..	34½	"
Siberian	" 20	124	36	Weak	8	"	6,480	74	4	34	Slightly.
Pense	" 14	118	48	Stiff	7	Sided	5,920	74	4	34	None.
Goldfinder	" 20	124	40	Medium	9	"	4,200	73	8	34	Slightly.
Golden Giant	" 16	120	36	"	7	"	4,480	72	32	34	None.
American Beauty	" 16	120	42	Stiff	10	Branching	4,400	72	22	34½	"
Black Mesdag	" 8	112	48	Medium	10	"	3,200	72	12	35	"
Milford	" 16	120	30	Weak	7	Sided	5,200	72	12	35½	"
Bavarian	" 14	118	40	Stiff	9	Branching	6,000	71	26	34½	"
Thousand Dollar	" 16	120	42	"	9	"	4,400	71	6	34	"
Improved American	" 16	120	42	"	8	"	4,320	70	20	34	"
Flying Scotchman	" 14	118	38	"	11	"	4,280	70	..	35½	"
Longhoughton	" 20	124	40	"	9	"	5,200	69	14	36	"
Wallis	" 14	118	48	Medium	6	"	3,680	68	28	34	"
Waverley	" 14	118	44	Stiff	9	"	4,720	68	18	35	"
Cromwell	" 16	120	42	Medium	6	"	4,640	68	8	34½	"
Mennonite	" 14	118	38	"	8	"	5,120	68	8	34	"
Miller	" 16	120	36	Weak	6	"	4,640	67	32	34	"
Rosedale	" 16	120	36	Medium	6	"	4,240	67	32	35	"
Joanette	" 14	118	36	Weak	9	"	5,000	67	2	34	"
Early Maine	" 14	118	42	Medium	8	"	4,880	66	16	34	"
Kendal	" 16	120	42	"	8	Sided	3,560	66	6	35½	"
Columbus	" 16	120	42	Stiff	9	Branching	4,800	65	30	35	Slightly.
Sensation	" 14	118	40	"	8	"	4,880	63	18	34	None.
Newmarket	" 16	120	36	Medium	6	"	4,240	62	12	34	"

OATS.—Effect of using different quantities of seed per acre.

Name of Variety.	Seed per Acre.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.	
	Bush.				Ins.		Ins.		Lbs.	Bu.	Lbs.
Banner	1½	April 30	August 15	107	39	Medium. .	7	Branching. .	4,640	65	30
"	2	" 30	" 15	107	39	" ..	7	" ..	5,040	70	20
"	2½	" 30	" 15	107	39	" ..	7	" ..	5,440	69	14
"	3	" 30	" 15	107	39	" ..	7	" ..	5,680	80	00
"	3½	" 30	" 15	107	39	" ..	7	" ..	5,400	72	32
"	4	" 30	" 15	107	39	" ..	7	" ..	5,040	71	26

EXPERIMENTS WITH BARLEY.

Fifty-two varieties of barley have been under trial, 22 of which were two-rowed sorts and thirty six-rowed.

They were all sown at the rate of two bushels per acre April 17, on plots of one-fortieth of an acre with seed from heads selected from the experimental plots of the previous year. The soil was a gravelly loam and fairly uniform.

Four plots of two-rowed and the same number of six-rowed varieties were sown with unselected, but carefully cleaned seed. When the barley was nearly ripe there were a few days of bright, hot sunshine which ripened the plots nearly all together, but an improvement in the appearance of the crops from selected seed over the ordinary seed was apparent from the time all were headed out. There was no rust on any of the plots.

Six plots alongside were sown with Mensury to compare the results from using different quantities of seed per acre.

TWO-ROWED BARLEY.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Ins.		Ins.	Lbs.	Bu.	Lbs.	Lbs.
Beaver.....	August 7	112	42	Stiff.....	3	7,600	61	2	48¾
Prize Prolific..........	" 14	119	40	"	4	6,200	59	8	48¼
Standwell	" 12	117	44	"	3½	5,920	55	40	49
Leslie........	" 10	115	46	"	3½	5,600	52	46	48¾
Nepean........	" 10	115	46	Medium. .	3½	5,600	52	24	49
Newton	" 8	113	42	" ..	3	5,280	51	42	48
French Chevalier..........	" 13	118	42	" ..	4	4,080	51	42	49½
Logan........	" 6	111	43	" ..	3	5,840	51	12	48¼
Harvey........	" 6	111	42	" ..	3½	5,480	51	2	48½
Kinver Chevalier..........	" 12	117	40	" ..	4½	4,120	50	40	48½
Bolton........	" 7	112	42	Stiff......	3	6,840	50	40	49
Jarvis	" 6	111	40	Weak	3½	5,680	50	40	48¼
Canadian Thorpe	" 10	115	42	Medium. .	3	3,400	50	20	49
Dunham........	" 7	112	41	Stiff.....	3½	5,880	50	..	48
Kirby	" 7	112	42	Medium. .	3	5,720	47	24	48½
Danish Chevalier..........	" 10	115	36	Stiff......	3½	3,000	47	4	48
Gordon........	" 8	113	46	"	3	4,600	46	32	49½
Clifford........	" 6	111	42	"	3½	3,920	46	22	48½
Victor	" 10	115	38	Medium..	3½	4,980	45	40	48
Fulton........	" 7	112	44	Stiff	3	3,200	38	16	48
Sidney	" 12	117	40	"	3½	3,480	37	44	48
Invincible........	" 13	118	40	"	3½	3,600	34	8	48

Six-rowed Barley.—Test of Varieties.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
			Inches.		Ins.	Lbs.	Bush.	Lbs	Lbs.
Royal	Aug. 5	110	38	Medium	3	5,920	67	24	49
Nugent	" 8	113	44	Stiff	2½	6,280	61	12	48¾
Common	" 8	113	38	"	2	5,480	60	40	48
Claude	" 7	112	42	"	3	6,440	60	40	48¼
Mensury	" 5	110	44	"	3½	7,000	59	28	48½
Mansfield	" 10	115	44	"	3	4,880	59	18	48
Odessa	" 8	113	38	Medium	2½	6,040	59	8	48
Yale	" 8	113	40	Stiff	2½	5,280	58	36	48¼
Empire	" 6	111	46	"	3	5,480	58	26	48½
Argyle	" 8	113	42	"	2½	5,320	58	16	48
Blue Long Head	" 7	112	40	"	3	5,280	57	4	48¾
Petschora	" 3	108	36	"	3	4,800	55	20	48
Rennie's Improved	" 5	110	38	Medium	2½	5,780	54	28	48¾
Excelsior	" 2	107	40	Stiff	2	5,320	54	28	48½
Albert	" 8	113	40	"	2½	5,960	54	28	48
Baxter	" 3	108	37	Medium	2¼	4,840	53	32	48½
Phœnix	" 5	110	40	"	2½	5,480	52	46	48¼
Brome	" 8	113	40	Stiff	3	5,440	52	16	48½
Pioneer	" 5	110	40	"	3	5,640	52	16	48
Oderbruch	" 2	107	42	Medium	3	4,520	51	44	48
Champion	" 2	107	38	Stiff	2½	4,840	51	4	48
Trooper	" 8	113	34	Weak	2	5,640	50	40	48
Success	" 2	107	36	"	2½	6,200	50	30	48
Stella	" 8	113	42	Medium	3	6,020	47	14	48
Vanguard	" 5	110	40	"	3½	5,360	47	14	48
Garfield	" 7	112	40	"	2	4,880	47	4	48
Summit	" 6	111	40	"	3	5,080	47	4	48
Surprise	" 8	113	36	Weak	2½	5,040	45	40	48
Hulless Black	" 5	110	34	"	2½	5,000	45	20	60
Hulless White	" 5	110	40	Stiff	2½	4,520	45	..	60

Barley.—Test of Varieties grown from Screened Seed on plots of one-fortieth acre.

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	
				In.		In.	Lbs.	Bush.	Lbs.
Six-rowed—									
Mensury	April 17	Aug. 6	111	44	Stiff	3	5,840	56	38
Nugent	" 17	" 8	113	44	"	3	6,400	58	28
Champion	" 17	" 2	107	38	"	2	3,480	49	26
Mansfield	" 17	" 10	115	42	"	3½	4,480	57	8
Two-rowed—									
Sidney	April 17	Aug. 12	117	40	"	3½	3,480	36	40
Canadian Thorpe	" 17	" 10	115	40	"	3	3,200	50	..
Nepean	" 17	" 10	115	44	"	3½	5,600	51	32
Kinver Chevalier	" 17	" 12	118	42	"	4	3,880	50	20

BARLEY, SIX-ROWED.—Results of using different quantities of seed per acre on plots of one-fortieth acre each.

Name of Variety.	Seed per Acre.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
	Bush.				In.		In.	Lbs.	Bush.	Lbs.	Lbs.
Mensury......	1½	April 30	Aug. 10	102	40	Stiff and bright..	3 to 3½	4,000	43	16	49
"	2	" 30	" 10	102	40	" ..	3 " 3½	4,400	48	16	49
"	2½	" 30	" 9	101	44	" ..	3 " 3½	5,600	55	40	49
"	3	" 30	" 9	101	44	" ..	3 " 3½	5,480	62	8	49
"	3½	" 30	" 8	100	44	" ..	3 " 3½	5,400	56	2	48
"	4	" 30	" 8	100	38	" ..	3 " 3½	3,480	46	32	48

EXPERIMENTS WITH SPRING WHEAT

Seventy-one varieties of spring wheat were tested this year on plots of one-fortieth of an acre each. The soil was a sandy loam, which was in clover the previous year. It was fall ploughed and thoroughly prepared in spring with a spading-harrow and smoothing-harrow. Most of the plots were sown with seed from heads selected from the plots the previous harvest. Eleven plots were sown alongside with screened seed saved from the produce of the plots when harvested without selection.

All the plots got a dressing of superphosphate of lime at the rate of one hundred pounds per acre, applied broadcast, when the plants were well above ground.

Six plots were sown with one variety of seed, to test the results of using different quantities of seed per acre. All were sown the same day and in every way the conditions were the same. The two plots with the heaviest seeding ripened a little sooner but in both cases the straw was weak and lodged.

SPRING WHEAT.—TEST OF VARIETIES.

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs
Roumanian*...... ...	April 16..	Aug. 20 .	126	48	Stiff.....	3	Bearded..	7,220	52	..	60½
Ebert	" 16..	" 14..	120	42	"	2½	Beardless.	6,440	51	30	60¾
Blair	" 16..	" 19..	125	36	Medium..	3½	" ..	7,440	51	10	61
Stanley	" 16..	" 20..	126	42	Stiff......	3	Bearded ..	7,000	50	40	60½
Countess..	" 16..	" 17..	123	42	" . ..	2½	Beardless.	6,360	50	40	60
Hastings......	" 22..	" 19..	119	44	Medium..	3½	" ..	6,600	50	..	61
Chester	" 22..	" 17..	117	42	" ..	3½	" ..	7,520	49	20	60¾
Cartier	" 22..	" 17.	117	40	" ..	3	Bearded..	6,800	48	40	61
Australian No. 9.....	" 22..	" 18..	118	44	Stiff......	3	Beardless.	6,720	48	40	61¼
Essex....	" 22..	" 19..	119	48	"	4	" ..	7,000	47	20	61
Crawford..	" 16..	" 13..	119	41	Medium..	3	Bearded..	6,480	47	20	69
Captor	" 16..	" 19..	125	42	Stiff......	3	Beardless.	6,800	47	..	60¼
Minnesota No. 169 ..	" 16..	" 19..	125	48	"	3	" ..	7,000	46	40	61
Alpha	" 16..	" 19..	125	48	"	4	" ..	6,520	46	40	60¾
Australian No. 23.....	" 22..	" 18..	118	50	Medium..	5	" ..	6,200	46	30	60¼
Early Riga...	" 22..	" 13..	118	42	" ..	3	" ..	5,840	46	20	61½
Dufferin	" 22..	" 13..	118	43	Stiff......	3½	Bearded..	6,600	46	10	60
Australian No. 19.....	" 22..	" 19..	119	48	"	3	Beardless.	6,600	45	20	60
Laurel	" 16..	" 20..	126	48	"	3	" ..	5,920	45	20	60

SPRING WHEAT.—TEST OF VARIETIES.

Name of Variety.	Date of Sowing.	Date of Ripening.	Number of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	
Cassel	Apr. 22..	Aug. 21..	121	46	Medium .	3½	Beardless.	5,160	44	50	60
Colorado	" 16..	" 16..	122	42	Stiff......	3½	Bearded..	4,560	44	40	61
Vernon	" 16..	" 13..	119	42	"	3	" ..	5,000	44	40	60
Red Fern	" 16..	" 20..	126	48	"	3	" ..	2,400	44	40	60
Hungarian	" 16..	" 20..	126	42	Medium..	2¼	" ..	5,800	44	40	61
Australian No. 25	" 22..	" 17..	117	46	Stiff... ..	4½	Beardless.	4,040	44	40	60½
Benton	" 22..	" 16..	116	46	Medium..	4	" ..	5,120	44	30	60
Huron	" 16..	" 19..	125	46½	Stiff.....	3	Bearded..	6,400	44	20	60½
Preston	" 16..	" 17..	123	40	"	3	" ..	5,200	44	..	60
Robin's Rust Proof	" 22..	" 17..	117	50	"	3¼	Beardless.	5,480	43	20	60½
Advance	" 16..	" 13..	118	46	"	3	Bearded..	5,360	43	20	59½
Minnesota No. 181	" 16..	" 20..	126	42	"	3	Beardless.	6,000	43	..	61
Pringle's Champlain	" 16..	" 19..	125	38	"	3	Bearded..	5,440	42	20	59¾
Red Swedish	" 16..	" 17..	123	38	Medium..	4	" ..	4,600	42	20	61
Bishop	" 22..	" 20..	120	46	Stiff.....	3½	Beardless.	6,200	42	..	60½
Beauty	" 16..	" 17..	123	42	"	3½	" ..	5,360	42	..	61
Minnesota No. 149	" 16..	" 20.	126	36	"	2½	" ..	6,200	41	40	61
Fraser	" 16..	" 12..	118	41	Medium..	3	Bearded..	3,520	41	40	61½
Ladoga	" 16..	" 12..	118	42	Stiff......	3½	" ..	5,800	41	20	60
Weldon	" 16.	" 16..	122	42	Medium..	3	Beardless.	4,400	41	20	61
Plumper	" 16..	" 20..	126	42	" ..	3½	Bearded..	5,200	41	20	60
Admiral	" 16..	" 19..	125	48	Stiff......	3½	Beardless.	5,200	41	20	61
Australian No. 10	" 22..	" 16..	116	48	Stiff......	4	" ..	5,120	40	40	60
Red Fife	" 16..	" 17..	123	40	"	2¾	" ..	4,640	40	30	61½
Mason	" 16 .	" 19..	125	36	Weak ...	2½	" ..	5,000	40	20	60
Japanese	" 22..	" 19..	119	38	Medium..	3	Bearded..	5,600	40	10	59½
White Fife	" 16..	" 17..	123	42	" ..	3	Beardless.	5,040	40	..	60
Australian No. 13	" 22..	" 17..	117	48	" ..	3½	" ..	5,000	39	40	61
Angus	" 22..	" 15..	115	44	" ..	4	" ..	4,480	39	40	60
Crown	" 16..	" 19 .	125	48	Stiff..	4	Bearded..	5,720	39	40	60
Australian No. 27	" 22..	" 17..	117	46	"	3½	Beardless.	5,120	39	40	60
Speltz	" 16..	July 29..	104	33	Medium..	2	Bearded..	3,440	39	30	40½
Dawn	" 16..	Aug. 17..	123	42	Stiff..	2½	Beardless.	5,280	39	20	60½
Progress	" 16..	" 19..	125	39	Medium..	3	" ..	5,160	39	10	59
Minnesota No. 163	" 16..	" 20..	126	36	" ..	3	" ..	4,600	38	40	60
Norval	" 16..	" 10..	116	38	" ..	3	Bearded..	3,360	38	20	60
Campbell's White Chaff	" 16..	" 19..	125	36	" ..	3	Beardless.	5,320	38	10	59½
White Russian	" 16..	" 20..	126	42	Stiff..	3	" ..	5,120	38	..	60
Blenheim	" 16..	" 17..	123	42	"	2½	Bearded..	4,680	38	..	60
Goose	" 16..	" 20..	126	36	Medium..	2½	" ..	4,480	37	40	61
Monarch	" 16.	" 20..	126	40	" ..	3	Beardless.	3,920	37	20	60
Herisson Bearded	" 16..	" 19..	125	38	" ..	2	Bearded..	4,520	37	..	60
White Connell	" 16..	" 20..	126	36	" ..	2	Beardless.	4,480	36	40	60
Percy	" 16..	" 17..	123	42	" ..	2½	" ..	4,560	37	..	60
Dion's	" 16..	" 17..	123	38	" ..	3	Bearded..	4,320	36	40	60
Rideau	" 16..	" 13..	119	44	" ..	2½	Beardless.	3,600	36	20	60½
Wellman's Fife	" 16..	" 19..	125	36	" ..	2½	" ..	5,120	36	20	60
Clyde	" 16..	" 20..	126	40	Stiff..	3	" ..	3,720	36	..	60½
Rio Grande	" 16..	" 16..	122	42	Slender...	3	Bearded..	5,040	35	40	60
Harold	" 16..	" 10..	116	40	Weak	3½	" ..	4,080	35	20	59
Byron	" 16..	" 13..	119	40	"	3½	" ..	5,120	34	..	60
Beaudry	" 16..	" 17..	123	48	Stiff..	3	" ..	4,800	31	..	59

SPRING WHEAT.—Test of varieties grown from screened seed.

Name of Variety.	Date of Sowing.	Date of Ripening	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Kind of Head.	Weight of Straw.	Yield per Acre.		Weight per Bushel.
				In.		In.		Lbs.	Bush.	Lbs.	Lbs.
Countess	Apl. 16..	Aug. 21..	127	40	Stiff & bright	2	Beardless.	6,000	44	40	60
Stanley	" 16..	" 22..	128	40	" "	3	Bearded..	5,200	43	20	60½
Captor	" 16..	" 19..	125	42	" "	3	Beardless.	6,200	41	40	60¾
Blenheim	" 16..	" 19..	125	40	" "	2½	Bearded..	4,320	41	20	60
Red Fife	" 16..	" 18..	124	36	" "	2½	Beardless.	3,600	39	30	61
Campbell's White Chaff.	" 16..	" 19..	125	35	Medium....	3	" ..	3,400	39	20	60
Red Swedish	" 16..	" 18..	124	39	"	3½	Bearded..	4,120	38	20	61
Goose	" 16..	" 21..	127	34	"	2½	" ..	6,000	38	..	60
Mason	" 16..	" 19..	125	38	Weak......	2	Beardless.	3,400	35	20	60
Dufferin	" 16..	" 14..	120	40	Stiff & bright	3	Bearded..	3,480	28	..	60
Crown	" 16..	" 20..	126	48	" "	4	" ..	4,080	26	..	61

SPRING WHEAT.—Results of using different quantities of seed per acre.

Name of Variety.	Seed per Acre.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Character of Straw.	Length of Head.	Weight of Straw.	Yield per Acre.	
	Bush.				In.		In.	Lbs.	Bush.	Lbs.
Percy	¾	Apl. 30..	Aug. 19..	111	40	Stiff & bright.	2½	4,480	34	40
"	1	" 30..	" 19..	111	42	" " ..	2½	4,800	36	
"	1½	" 30..	" 19..	111	42	" " ..	2½	5,200	37	20
"	2	" 30..	" 19..	111	40	" " ..	2½	4,960	36	40
"	2½	" 30..	" 17..	109	40	Weak........	2	4,800	39	20
"	3	" 30..	" 17..	109	40	"	2	4,320	40	20

Plots five and six were lodged as the straw was slender and soft and the heads shorter.

EXPERIMENTS WITH PEASE.

Fifty-nine varieties of pease were tested this year, side by side, in plots of one-fortieth of an acre each. The soil was a gravelly loam which had only been once cropped since it was cleaned, and a great many ferns grew on it, which to some extent, lessened the yield. Their presence in the straw partly accounts for the heavy gross yield. The straw was clean and bright, the season was favourable for pease and the yield is a fairly good average one. All the plots were sown April the 15th, but the cold weather in May and June increased the number of days to mature considerably beyond the average.

PEASE.—TEST OF VARIETIES.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Weight of Straw.	Length of Pod.	Size of Pea.	Yield per Acre.		Weight per Bushel.
				Inches.	Lbs.	Inches.		Bush.	Lbs.	Lbs.
English Grey	Aug. 21.	128	Rank	60	8,000	2½	Large	64	..	61¾
Harrison's Glory	" 22.	129	"	74	6,200	3½	"	60	40	62
Duke	" 23.	130	Strong	66	7,120	2½	"	60	..	61½
Early Britain	" 15.	122	Rank	56	8,960	3½	"	59	20	61¾
Pride	" 23.	130	"	60	8,200	2	"	59	20	62
Fergus	" 26.	133	Strong	48	7,040	2	Small	59	..	63
Mackay	" 21.	128	Medium	66	7,760	2½	"	58	50	61
Arthur	" 20.	127	Strong	48	6,400	2	Large	57	50	60½
New Potter	" 21.	128	"	78	6,720	2	"	57	20	60¾
Elephant Blue	" 19.	126	"	60	8,000	2	Medium	57	..	61¼
Agnes	" 24.	131	"	74	6,200	3¼	Large	56	50	61½
Prince Albert	" 21.	128	"	54	6,680	2½	Small	56	40	61
Perth	" 23.	130	"	48	7,600	2½	"	56	..	60¾
Large White Marrowfat	" 24.	131	"	54	5,920	2	"	55	20	61
Gregory	" 19.	126	"	60	6,400	2½	Medium	55	..	61½
White Wonder	" 24.	131	"	66	6,480	2	"	54	20	61¼
Nelson	" 16.	123	"	60	8,320	3	"	54	..	62
Prince	" 20.	127	"	42	6,400	2	Large	54	..	61½
Trilby	" 20.	127	Rank	84	6,800	2½	Medium	52	50	60¾
Elder	" 23.	130	Medium	60	6,300	2	"	52	40	61
Crown	" 21.	128	Rank	54	7,360	2	Small	52	30	61
Bruce	" 20.	127	Strong	52	7,040	2½	Large	52	30	60
Carleton	" 23.	130	Rank	96	8,000	2½	Medium	52	20	60
Picton	" 24.	131	Strong	60	7,600	2	"	52	10	60
Kent	" 26.	133	"	54	8,400	2	Large	52	..	60½
German White	" 21.	128	"	54	5,200	2½	Medium	52	..	61
Alma	" 20.	127	"	60	9,400	2½	Small	51	20	60
Centennial	" 24.	131	"	60	7,040	2	Medium	50	40	61
French Canner	" 21.	128	"	60	5,200	2½	"	50	..	61½
Vincent	" 20.	127	"	60	6,320	2½	Large	49	50	60
Paragon	" 23.	130	"	62	6,480	2½	Medium	49	40	62
Lanark	" 23.	130	"	42	8,360	2½	Large	49	20	61½
Prussian Blue	" 19	126	Medium	54	7,600	2	Medium	48	40	62
Creeper	" 15.	122	"	60	4,800	3	Small	48	40	61
Golden Vine	" 26.	133	Rank	66	5,600	2½	"	48	20	61½
Daniel O'Rourke	" 15.	122	Medium	60	7,920	2½	"	48	10	62
Pearl	" 23.	130	Very rank	102	6,720	2½	Large	48	..	60
Chancellor	" 23.	130	Strong	66	5,840	2	Medium	48	..	61
Wisconsin Blue	" 26.	133	"	72	5,600	2½	Small	47	40	62½
King	" 24	131	"	54	5,920	2½	Large	47	20	60½
Cooper	" 23.	130	Medium	54	7,600	3	"	47	10	60
Blk. Eyed Marrowfat	" 20.	127	Strong	54	6,800	2½	"	47	10	60
Victoria	" 20.	127	"	58	8,200	2½	Small	47	..	61½
Herald	" 23.	130	"	66	6,720	2	Large	46	40	60
Multiplier	" 24.	131	"	66	5,360	2	Small	46	30	62½
Archer	" 24.	131	"	60	7,600	1½	Medium	45	20	60½
Bedford	" 24.	131	"	56	8,040	2	"	44	40	60
Mummy	" 24.	131	"	48	7,920	2	"	44	..	61
Elliot	" 26.	133	"	66	6,160	2	Small	42	20	62½
Macoun	" 23.	130	"	60	6,840	2	Large	42	..	60½
Fergus	" 26.	133	"	48	7,060	2	Small	42	..	60½
Oddfellow	" 23.	130	Medium	46	6,200	3	Medium	41	20	62½
Fenton	" 16.	123	"	46	7,880	2	Large	40	20	61
Bright	" 26.	133	Strong	52	5,160	2	Medium	39	20	61
Dover	" 23.	130	"	60	6,720	2	Large	38	40	60
Chelsea	" 21.	128	Medium	54	6,960	3	Medium	38	40	62
Canadian Beauty	" 23.	130	Strong	60	7,040	2½	Large	37	20	60
Grass Pea	Sept. 3.	141	Poor	36	4,160	1	Small	24	40	61½

OATS.—TESTS WITH FERTILIZERS.

Six plots of Banner oats, one-fortieth of an acre each, were included in this test. The land was a gravelly loam, that had given a crop of wheat in 1900, following clover.

Plot 1.—One hundred pounds nitrate of soda per acre, one-half sown broadcast when the plants were well above the ground and the other half when they were about 6 inches high.

Plot 2.—Two hundred pounds nitrate of soda per acre ; one-half applied broadcast when the plants were well above ground and the other half when about 6 inches high.

Plot 3.—Check plot no fertilizer applied.

Plot 4.—Four hundred pounds superphosphate of lime per acre, scattered broadcast and lightly harrowed before the seed was sown.

Plot 5.—Four hundred pounds muriate of potash per acre ; sown broadcast and harrowed before the seed was sown.

Plot 6.—Two hundred pounds superphosphate of lime, 100 pounds muriate of potash, and 100 pounds of nitrate of soda per acre. Half of the material scattered over the surface before the seed was sown and the other half when the plants were about 2 inches above ground.

All the conditions as to soil and seed were identical. All were sown April 24, using seed at the rate of 2½ bushels per acre. All the plots ripened together and were cut the same day. There was no rust on any of the plots.

Name of Variety.	Character of Straw.	Weight of Straw.	Yield per Acre.		Proportion Rusted.
		Lbs.	Bush.	Lbs.	
Banner, Plot 1—Nitrate of soda, 100 lbs. per acre....	Medium. ...	4,600	58	28	None.
" " 2— " 200 "	" ...	5,000	62	12	"
" " 3—No fertilizer........................	Weak	3,800	54	4	"
" " 4—Superphosphate, 400 lbs. per acre...	Stiff.... ...	5,400	68	28	"
" " 5—Muriate of potash, 400 lbs. per acre.	"	4,600	74	12	"
" " 6—Superphosphate, 200 lbs. ; muriate of potash, 100 lbs. ; nitrate of soda, 100 lbs. per acre................	"	5,800	82	32	"

PEASE.—TESTS WITH FERTILIZERS.

Four plots of pease, of one-twentieth of an acre each, were sown April 15, and when the plants were about 2 inches above ground nitrate of soda, at the rate of 100 pounds per acre, was scattered broadcast over the plot, and when they were about 6 inches high another 100 pounds was applied as before.

The soil was a very gravelly loam, that was first broken up in the winter of 1899 and 1900, and pease sown in spring of 1900, but they were destroyed by cutworms. This year the vines grew very rank in each case and were extra well podded. The results are given in the following table :—

Name of Variety.	Date of Sowing.	Date of Ripening.	No. of Days Maturing.	Character of Growth.	Length of Straw.	Length of Pod.	Yield per Acre.		Weight per Bush.
					In.	In.	Bush.	Lbs.	Lbs.
King....	April 15..	Aug. 24..	131	Rank... .	60	3	106	20	61½
German White..	" 15..	" 21..	128	"	58	3	102	..	62
Perth	" 15..	" 23..	130	"	56	3½	94	40	61
Centennial......	" 15..	" 24..	131	" . .	66	2¾	90	40	61

POTATOES.—TESTS WITH FERTILIZERS.

Experiment was also made to test the value of nitrate of soda and superphosphate of lime applied to potatoes.

The land chosen was some of the oldest on the farm and may be considered fairly uniform in character and condition. It was in clover last year and the clover sod was ploughed under for the potato crop.

The results show, as do most experiments of similar nature, that where a clover stubble is turned under in a short rotation, nitrogen in plenty, for the crop is already in the land. There were no rotten potatoes in any of the plots.

Name of Variety.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.	
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.
Dakota Red, Plot 1—Nitrate of soda, 100 lbs. per ac.	633	36	633	36	538	36	95	
" " 2— " 150 " ..	644	36	644	36	548		96	36
" " 3— " 200 " ..	657	48	657	48	526		131	48
" " 4—Untreated....................	638		638		572	30	65	30
" " 5—Superphosphate, 100 lbs. per ac.	655	36	655	36	590	36	65	36
" " 6— " 150 " ..	688	36	688	36	617	6	71	30
" " 7— " 200 " ..	743	30	743	30	664		79	30

EXPERIMENTS WITH INDIAN CORN.

Thirty-three varieties of corn were planted in the test this year.

All were sown May 20 and 21. The land was clover sod, well harrowed and prepared and was in fine condition, but the weather in the last of May and all of June was cold and wet and the germination of the seed was delayed in consequence, and the growth was very slow until the middle of July. During the last half of July, all of August, September and most of October the weather was dry, bright and warm, and the corn made a fair growth, but the unfavourable weather in the beginning of the season put the growth back and it never recovered lost ground. Very few varieties made good ears of corn. All the varieties were tested both in hills and drills, the drills were three feet apart and the stalks thinned to about six inches in the drill. The hills were three feet apart each way and not more than three plants to a hill.

The yield has been calculated from two rows each, sixty-six feet long.

INDIAN CORN.—TEST OF VARIETIES.

Name of Variety.	Height.	When Tasselled.	In Silk.	Early Milk.	Late Milk.	Condition when cut.	Weight per Acre grown in rows.		Weight per Acre grown in hills.	
	Inc.						Tons.	Lbs.	Tons.	Lbs.
Mamm. 8-rowed Flint...	96	Aug. 16..	Sept. 10..	Sept. 20.	Oct. 14.	Late milk.	22	1,320	21	1,020
Thorobred White Flint..	90	" 18..	" 20..	Oct. 4.	....	Ea. milk..	22	220	16	1,180
White Cap Yellow Dent	108	" 22..	" 20..	" 4.	....	" ..	20	1,250	16	1,400
Early Mastodon.........	90	" 10..	" 16..	Sept. 24.	....	Roast. ear	20	700	15	360
Compton's Early	100	" 16..	" 20..	Oct. 1.	....	Ea. milk..	19	1,820	16	1,440
Mammoth Cuban	112	" 29..	" 20..	" 2.	....	" ..	17	320	16	780
King of the Earliest.....	112	" 14..	" 3..	Sept. 20.	Oct. 7.	L. milk...	16	1,660	15	690
Salzer's All Gold........	76	" 12..	" 1..	" 18.	Sept. 24.	Glazed....	15	1,680	17	210
" Superior Fodder.	106	" 28..	" 16..	Oct. 4.	....	Ea. milk.	15	1,570	13	1,060
Selected Leaming.......	106	" 28..	" 15..	" 8.	....	" ..	15	1,460	17	540
Pride of the North.......	108	Sept. 18..	Oct. 8..	....	....	Silk......	15	1,240	16	1,000
Champion White Pearl. .	108	" 6..	Sept. 29..	Oct. 10.	....	Ea. milk..	15	1,020	16	1,440
Extra Early Huron Dent	102	Aug. 23..	" 13..	Sept. 24.	Oct. 14.	L. milk...	15	800	13	950
Longfellow.............	96	" 10..	Aug. 26..	" 20.	" 8.	Glazed....	15	580	15	1,900
Early Butler.	106	" 15..	" 30..	" 30.	....	Roast. ear	15	360	15	1,460
North Dakota White....	90	" 17..	" 30..	" 28.	Oct. 16.	L. milk...	15	360	13	1,940
Red Cob Ensilage..	112	Sept. 3..	Sept. 20..	Oct. 14.	....	Ea. milk..	14	380	16	1,770
Kendall's Early Giant...	84	Aug. 18..	Aug. 30..	Sept. 26.	Oct. 18.	L. milk...	13	1,610	7	280
Yellow Long Eared....	76	" 20..	Sept. 6..	" 16.	Sept. 28.	Glazed....	12	1,960	13	1,280
Cloud's Early Yellow...	108	" 28..	" 16..	" 28.	....	Ea. milk..	12	1,520	12	200
Giant Prolific Ensilage..	106	" 30..	" 17..	" 30.	....	" ..	12	1,410	12	1,080
Canada White Flint....	84	" 16..	Aug. 30..	" 22.	Oct. 14.	L. milk...	11	1,860	11	440
Evergreen Sugar........	90	" 18..	" 30..	Oct. 16.	....	Ea. milk..	11	1,430	10	130
Sanford..................	100	" 14..	" 26..	Sept. 18.	Oct. 18.	L. milk...	10	1,780	13	1,060
Angel of Midnight......	84	" 22..	Sept. 18..	Oct. 10.	....	Ea. milk..	10	1,340	10	1,890
Pearce's Prolific.........	96	" 30..	" 16..	Sept. 30.	Oct. 18.	L. milk...	10	20	9	1,140
Country Gentleman. ...	80	" 30..	" 26..	Oct. 16.	....	Ea. milk..	9	150	6	860
North Dakota Yellow...	48	" 15..	Aug. 30..	Sept. 14.	Oct. 6.	Glazed....	8	1,160	9	1,800
Black Mexican.....	80	" 24..	Sept. 10..	" 22.	" 11.	L. milk...	7	520	7	300
Salzer's Earliest Ripe ...	48	" 16..	Aug. 28..	" 10.	" 4.	Glazed....	5	1,440	4	800
Yellow Six Weeks	48	" 10..	" 20..	" 4.	" 16.	Ripe	5	560	4	1,240
Mitchell's Extra Early..	48	" 2..	" 12..	Aug. 28.	" 10.	"	5	340	5	450
Early August...........	50	July 29..	" 9..	" 24.	" 6.	"	5	120	4	1,240

CORN AT DIFFERENT DISTANCES APART IN THE ROWS.

The same varieties were used in this test as were used last season.

The plants were trimmed to six inches in the drill and to three strong plants in the hill. The yield, as in previous years, is usually the heaviest where the drills or rows are at the least distance. In each case four rows of each variety were planted and the yield computed from 66 feet of the two centre rows. The plots were all planted May 20.

CORN.—AT DIFFERENT DISTANCES APART.

Name of Variety.	Date Sown.	Distance apart in Rows.	Hills.	Condition when cut.	Weight per Acre grown in rows.		Weight per Acre grown in hills.	
		Inches.	Inches.		Tons.	Lbs.	Tons.	Lbs.
Champion White Pearl....	May 20....	21	21	Early milk..	26	1,564	23	388
" "	" 20....	28	28	" ..	21	151	19	1,034
" "	" 20....	35	35	" ..	17	1,750	16	1,716
" "	" 20....	42	42	Late milk ..	14	838	13	400
Selected Leaming.....	" 20 ..	21	21	" ..	23	675	21	240
" "	" 20....	28	28	" ..	21	428	19	751
" "	" 20...	35	35	" ..	17	734	15	129
" "	" 20...	42	42	" ..	14	1,134	13	1,908
Longfellow	" 20....	21	21	. . .. ..	14	1,735	15	171
"	" 20....	28	28	....	17	791	17	1,922
"	" 20....	35	35	....	14	285	13	249
"	" 20...	42	42	Late milk ..	13	195	12	1,958

EXPERIMENTS WITH TURNIPS.

Twenty-nine varieties of Turnips were tested. Two sowings of each sort were made, the first on May 28, and the second on June 11. All were pulled November 11. The soil was a clay loam, had been in cultivation since 1890, and had become fairly uniform. A good clover sod was turned under in spring of 1897, and another in spring of 1900, and a light dressing of stable manure given last winter which was thoroughly mixed with the soil before the seed was sown. The land was uniform and as will be seen, the yields are good.

The yields per acre have been calculated from the weight of crop gathered from two rows, each 66 feet long. The crop from the first sown plots gave a considerably higher average than that from the second sown.

TURNIPS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Emperor Swede	49	10	1,633	30	48	30	1,206	30
Magnum Bonum	48	1,020	1,670	..	38	1,220	1,287	..
Imperial Swede	47	380	1,573	..	42	1,140	1,419	..
East Lothian	46	1,720	1,562	..	39	540	1,309	..
Prize Purple Top	46	70	1,534	30	38	1,385	1,289	45
Hall's Westbury	45	420	1,507	..	42	1,470	1,424	30
Jumbo	45	255	1,504	15	38	1,220	1,289	45
Monarch	45	172	1,502	52	42	1,140	1,419	..
Elephant's Master	44	770	1,479	30	35	600	1,176	40
Marquis of Lorne	44	440	1,473	20	34	1,630	1,160	30
New Arctic	43	1,935	1,465	35	41	1,820	1,397	..
Skirvings	43	1,450	1,457	30	40	1,180	1,353	..
Drummond Purple Top	43	1,120	1,452	..	38	230	1,270	30
Prize Winner	43	460	1,441	..	42	1,140	1,419	..
Sutton's Champion	43	295	1,438	15	40	850	1,347	30
Carter's Elephant	42	1,305	1,421	45	42	480	1,408	..
Mammoth Clyde	41	1,820	1,397	..	39	540	1,309	..
Selected Champion	41	800	1,380	30	35	620	1,177	..
Kangaroo	40	1,840	1,364	..	45	1,080	1,584	40
Giant King	40	1,180	1,353	..	35	620	1,177	..
Hartley's Bronze	40	520	1,342	..	35	950	1,182	30
Champion Purple Top	40	350	1,339	15	39	530	1,325	30
Selected Purple Top	39	1,530	1,325	30	35	290	1,171	30
Bangholm Selected	38	1,220	1,287	..	42	1,140	1,419	..
Perfection Swede	38	1,055	1,284	15	38	230	1,270	30
Shamrock Purple Top	38	890	1,281	30	37	1,900	1,265	..
West Norfolk Purple Top	37	1,570	1,259	30	29	1,730	995	30
Halewood's Bronze Top	35	1,128	1,171	20	38	1,055	1,284	35
Webb's New Renown	34	1,960	1,166	..	38	65	1,267	45

EXPERIMENTS WITH MANGELS.

Twenty-four varieties of Mangels were tested this year. The soil was a loam mixed sandy and clay, and had only produced one crop since breaking up. After breaking up a good deal of levelling was necessary and as a consequence the condition was not uniform nor the stand even. Two plots of each variety were sown, the first on April 26, and the second on May 10. All were pulled on November 6. Four rows, each one hundred feet long, of each sort was sown at each sowing and the yield was computed from the two centre rows, each 66 feet long.

MANGELS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Giant Yellow Intermediate	26	120	902		23	530	775	30
Mamm. Yellow Intermediate	24	840	814		21	570	709	30
Lion Yellow Intermediate	22	1,000	750		20	95	668	15
Yellow Intermediate	21	1,065	717	25	19	610	643	30
Warden Orange Globe	20	920	682		19	940	649	
Prize Winner Orange Globe	20	460	674	20	14	1,865	497	40
Champion Yellow Globe	20	95	668	15	19	280	638	
Yellow Fleshed Tankard	19	1,930	665	30	17	320	572	
Norbiton Giant	19	1,600	660		17	1,640	594	
Selected Mamm. Long Red	19	1,435	657	15	21	240	704	
Mammoth Oval Shaped	19	775	646	15	21	590	709	50
Giant Yellow Globe	19	280	638		16	670	544	30
Half Long Sugar White	17	1,640	594		15	360	506	
Prize Mamm. Long Red	17	320	572		16	1,000	550	
Mammoth Long Red	16	1,660	561		16	1,990	566	
Gate Post	16	1,165	552	45	17	1,640	594	
Giant Yellow Half Long	16	1,085	551	35	17	1,475	591	15
Leviathan Long Red	16	835	547	15	15	690	511	30
Triumph	16	340	539		17	320	572	
Gate Post Yellow	15	1,020	517		13	400	440	
Half Long Sugar Rosy	15	360	506		14	1,700	495	
Golden Fleshed Tankard	13	730	445	30	17	980	583	
Canadian Giant	12	1,740	429		16	1,330	555	30
Ward's Large Oval Shaped	9	480	308		11	1,430	390	30

The seed of the Red Fleshed Tankard failed to germinate.

EXPERIMENTS WITH CARROTS.

Twenty varieties of carrots were tested this year. They were sown alongside of the mangels, and the soil and conditions were in every respect similar. Two plots of each sort were sown, in drills 2 feet apart, the first series of plots were sown April 25 and the second on May 9, and all pulled November 5. As in previous years the stump rooted sorts gave the best yield and are more desirable because easier to pull and less liable to break in handling. The yield is computed from 66 feet of the two centre rows in each plot.

CARROTS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Improved Short White	30	1,220	1,020	20	25	637	843	57
Iverson's Champion	30	720	1,012		30	390	1,006	30
Giant White Vosges	28	1,585	959	45	28	740	979	
Ontario Champion	28	100	935		26	1,130	885	30
Green Top White Orthe	27	1,440	924		28	1,585	959	45
Mamm. White Intermediate	27	1,110	918	30	25	1,974	866	14
Carter's Orange Giant	26	1,130	885	30	26	635	871	35
Yellow Intermediate	26	1,046	884	26	21	240	704	
Early Gem	26	800	880		21	1,548	725	48
New White Intermediate	25	1,263	854	23	26	140	869	
Half Long White	25	490	841	30	28	1,585	959	45
Long Yellow Stump Rooted	23	1,520	792		25	1,314	855	14
Scarlet Intermediate	23	1,468	791	8	21	240	704	
White Vosges, Large Short	21	1,230	720	30	24	1,500	825	
Half Long Chantenay	20	920	682		20	1,580	693	
Long Scarlet Altringham	20	590	676	30	19	1,930	665	30
White Belgian	19	1,765	662	45	24	1,181	819	41
Guerande or Ox-Heart	17	1,640	594		18	1,143	619	3
Long Orange or Surrey	14	1,040	484		13	1,720	462	
Scarlet Nantes	13	1,573	459	23	13	70	434	30

EXPERIMENTS WITH SUGAR BEETS.

Seven varieties of sugar beets were tested alongside of the carrots and mangels and under similar conditions. Two sowings were made of each sort, the first on April 26 and the second on May 10, and all were pulled November 6. The yields are not heavy and they have not been as profitable to raise for feeding here as mangels or carrots, because of the lighter yield and being more difficult to harvest. They are often rooty and the growth is nearly all underground. Four rows of each sort were sown and the yield computed from 66 feet of each of the two centre rows.

SUGAR BEETS.—TEST OF VARIETIES.

Name of Variety.	Yield per Acre. — 1st Plot.		Yield per Acre. — 1st Plot.		Yield per Acre. — 2nd Plot.		Yield per Acre. — 2nd Plot.	
	Tons.	Lbs.	Bush.	Lbs.	Tons.	Lbs.	Bush.	Lbs.
Improved Imperial	16	1,990	566	30	13	1,720	462	10
Danish Red Top	16	1,330	555	30	17	980	583	
Royal Giant	16	1,165	552	45	17	816	580	16
Vilmorin's Improved	13	1,060	451		14	1,700	495	
Red Top Sugar	13	400	440		15	30	500	30
Danish Improved	11	441	374		12	420	407	
Wanzleben	9	480	308		9	150	302	30

EXPERIMENTS WITH POTATOES.

Ninety varieties of potatoes were planted, May 8 and 9, on clay loam, which had been given about twenty wagon loads per acre of barnyard manure in the spring of 1900. This had been worked well into the soil with spading-harrow and drag and a crop of oats grown that year. As soon as the oats were harvested the land was well harrowed to start weed seeds and shed grain and ploughed late in the fall. In spring it was well stirred and mixed by use of the spading-harrow and drag, and the potatoes planted in drills $2\frac{1}{2}$ feet apart. The spring was wet and cold but the seed germinated well and the stand was even throughout. The yield is a very good one and the quality all that could be desired. Except a few rows left as check rows, all were sprayed with Bordeaux mixture to prevent injury by blight ; but those untreated remained healthy until ripened as there was no blight this season. Four rows of each sort were planted and the yield per acre calculated from two centre rows, 66 feet long. There was very little rot this year and the crop throughout was very even and fine.

Potatoes.—Test of Varieties.

Name of Variety.	Total Yield per Acre.		Yield per Acre of Sound.		Yield per Acre of Rotten.		Yield per Acre of Marketable.		Yield per Acre of Unmarketable.		Form and Colour.
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	
Uncle Sam	686	24	686	24	None	..	617	46	68	38	Round white.
Dakota Red	682		682		"	..	613	48	68	12	Long red.
Polaris	677	36	677	36	"	..	576		101	36	" white.
Vanier	675	24	675	24	"	..	573	46	101	38	" dark red.
Money Maker	673	12	673	12	"	..	605	52	67	20	" white.
Swiss Snowflake	673	12	673	12	"	..	605	52	67	20	Round "
American Giant	662	12	662	12	"	..	596		66	12	Long "
McIntyre	660		660		"	..	429		231		" pink.
Holborn Abundance	651	12	651	12	"	..	553	42	97	30	Round white.
Vick's Extra Early	633	36	633	36	"	..	506	56	126	40	" pale rose.
Bovee	629	12	629	12	"	..	534	50	94	22	Long rose.
New Variety No. 1	629	12	629	12	"	..	566	17	62	55	Round pale rose.
Seedling No. 230	624	48	624	48	"	..	468	36	156	12	" white.
Rochester Rose	622	36	622	36	"	..	497	47	124	52	Long rose.
Seedling No. 7	618	12	618	12	"	..	556	24	61	48	" red.
Northern Spy	616		616		"	..	492	48	123	12	" pink.
Lee's Favorite	614	54	614	54	"	..	522	40	92	14	" rose.
Hale's Champion	613	48	613	48	"	..	429	40	184	8	Round white.
Prize Taker	613	48	613	48	"	..	460	21	153	27	" red.
Clay Rose	613	48	613	48	"	..	552	26	61	22	Long rose.
Reeves' Rose	608	48	608	48	"	..	548		60	48	" "
Burnaby Seedling	607	12	607	12	"	..	546	20	60	42	" "
Flemish Beauty	606	12	606	12	"	..	424	24	181	48	" flat rose.
Empire State	594		594		"	.	475	12	118	48	" pink white.
Early Puritan	592	54	592	54	"	..	504	12	88	42	" white.
Columbus	589	36	589	36	"	..	501	11	88	25	" flat rose.
Carman No. 3	585	12	585	12	"	.	497	18	87	54	Oblong white.
Irish Daisy	580	48	580	48	"	.	348	28	232	20	Round white.
Quaker City	574	12	574	12	"	..	516	48	57	24	Flat "
Sabean's Elephant	569	48	569	48	"	..	484	21	85	27	" long white.
Daisy	558	48	558	48	"	..	391		167	48	Long pink and white.
Late Puritan	556	36	507		55	36	390		111		" "
Troy Seedling	554	24	554	24	None	..	471		83	24	" red.
I X L	553	18	553	18	"	..	470	24	82	54	" flat pink and white.
Green Mountain	553	18	553	18	"	..	470	18	83	..	Long flat white.
Brownell's Winner	547	48	547	48	"		465	39	82	9	" red.
Rose No. 9	545	36	545	36	"		490	36	55	..	" rose.
Delaware	543	24	543	24	"	..	489	24	54	..	Round white.
Houlton Rose	542	18	542	18	"	.	412	58	129	26	Long flat rose.
Carman No. 1	541	12	541	12	"	..	487	12	54	12	Round white.

Potatoes.—Test of Varieties—*Concluded.*

Name of Variety.	Total Yield per Acre. Bush.	Lbs.	Yield per Acre of Sound. Bush.	Lbs.	Yield per Acre of Rotten. Bush.	Lbs.	Yield per Acre of Marketable. Bush.	Lbs.	Yield per Acre of Unmarketable. Bush.	Lbs.	Form and Colour.
Seattle	541	12	541	12	None...		432	57	108	15	Long round white.
General Gordon	537	54	537	54	"	.	403	26	134	28	" red.
Sharpe's Seedling	533	30	533	30	"	..	400	5	133	25	" round rose.
Brown's Rot Proof	533	30	533	30	"	..	426	48	106	42	" red.
Early Harvest	528		528	..	"	..	448	48	79	12	" white.
Cambridge Russet	525	48	525	48	"	..	420	48	105	..	" round russet.
American Wonder	523	36	523	36	"	..	418	48	104	48	" flat white.
New Queen	521	24	521	24	"	..	365		156	24	" round red.
State of Maine	519	12	519	12	"	..	415		104	12	" pink.
Beauty of Hebron	514	48	514	48	"	..	409		105	48	" white.
Lizzie's Pride	510	24	510	24	"	..	357	24	153	..	" red.
Country Gentleman	509	18	509	18	"	..	433	18	76	..	" pink and white.
Enormous	506		506	..	"	..	404	50	101	10	" white.
Wonder of the World	501	36	501	36	"	..	296	36	205	..	" rose.
Early Michigan	500	30	500	30	"	..	300	30	200	..	" white.
Rawdon Rose	484		484	..	"	..	445	36	48	24	" rose.
Maule's Thoroughbred	479	46	455	46	24	.	410	12	45	34	" "
Chicago Market	479	46	479	46	None...		430	46	49	..	" red.
Everett	475	12	475	12	"	..	403	56	71	16	" round red.
Early Norther	475	12	475	12	"	..	402	50	72	22	" pink and white.
Early Andes	475	12	451	27	23	45	316		135	26	Round rose.
Canadian Beauty	470	48	470	48	None...		423		47	48	Long flat rose.
Early St. George	448	58	426	32	22	26	384		42	32	" white.
Rural Blush	444	24	444	24	None.	.	356	12	88	12	Round rose.
Maggie Murphy	440		440	..	"	..	358		66	..	Long rose.
Early Rose	437	48	437	48	"	..	307	48	130	..	" "
Thorburn	435	36	435	36	"	..	261	42	173	54	Oblong pink.
Bill Nye	431		431	..	"	..	301	20	129	40	" white.
Early White Prize	429	54	429	54	"	..	301	54	128	..	" "
Pride of the Market	430	39	430	39	"	..	376	15	64	24	Long flat white.
Up to Date	426	48	426	48	"	..	277	18	149	30	Oval white.
White Beauty	413	36	413	36	"	..	350	54	62	42	Long flat white.
Sutton's Invincible	400	34	400	34	"	..	342		58	24	" white.
Pearce's Prize Winner	400	34	400	34	"	..	260		140	34	" pink and white.
Burpee's Extra Early	398	12	398	12	"	..	238	56	159	16	" rose.
Earliest of All	396		396	..	"	..	277	12	118	48	Round white.
Early Sunrise	391	36	391	36	"	..	270	12	120	24	Long rose.
Prolific Rose	385	32	385	32	"	..	270		115	32	" "
Great Divide	371	48	371	48	"	..	223	6	148	42	Round white.
Sutton's Supreme	371	15	371	15	"	..	318	48	52	27	Long white.
Ohio Junior	365	12	365	12	"	..	219	12	146	..	" pink.
Clarke's No. 1	364	6	364	6	"	..	218	51	145	15	" "
Penn Manor	352		352	..	"	..	281	36	70	24	" red.
Rural No. 2	352		352	..	"	..	301		51	..	Oblong white.
Pearce's Extra Early	347	36	347	36	"	.	243	20	104	16	" rose.
Early Six Weeks	343	12	343	12	"	..	274	42	68	30	" pale rose.
Early Ohio	338	48	338	48	"	..	220	18	118	30	" dark rose.
Early Market	316	48	316	48	"	..	190	0	126	48	Oval rose.
Irish Cobbler	314	36	314	36	"	..	236		78	36	Round white.
Sir Walter Raleigh	312	24	312	24	"	..	218	40	93	44	Flat "

FODDER PLANTS.

The following fodder plants were tested this year. The ground was so cold and wet early in the season that there was a very poor stand in nearly every one of the millets, also in soja and horse beans and the subsequent growth has been poor. As in previous years the Japanese millet is the heaviest yielder, the foliage being very abundant and

the heads long and well filled while the stalks are not very coarse. All the plots of millet seeds were sown May 27.

Plot 1—Italian Millet :—

Length of stalk, 28 to 32 inches ; length of head, 4 to 5 inches ; yield when cut green, per acre, 3 tons 240 pounds.

Plot 2—Cat Tail Millet :—

Length of stalk, 30 to 32 inches ; length of head, 3½ to 4 inches ; yield per acre when cut green, 2 tons 1,680 pounds.

Plot 3—Early Algerian or Early Pearl Millet :—

Length of stalk, 30 to 32 inches ; length of head, 3 to 4 inches; yield per acre when cut green, 2 tons 1,280 pounds.

Plot 4—Moha Hungarian Millet :—

Length of stalk, 30 to 34 inches; length of head, 3 to 4 inches; yield per acre, cut green, 3 tons 720 pounds.

Plot 5—White Round Extra French Millet :—

Length of stalk, 20 to 24 inches; length of head, 2 to 3 inches; yield per acre when cut green, 2 tons 1,520 pounds.

Plot 6.—German or Golden Millet :—

Length of stalk, 24 to 26 inches; length of head, 3 to 4 inches; yield per acre when cut green, 3 tons 1,200 pounds.

Plot 7—Japanese Millet :—

Length of stalk, 40 to 44 inches; length of head, 4 to 6 inches; yield per acre when cut green, 4 tons 480 pounds.

Plot 8—Soja Beans, sown April 30 :—

Drills, 21 inches apart; length of stalk, 24 to 26 inches; very few pods formed; yield per acre when cut green, October 30, 2 tons 1,340 pounds.

Plot 9—Soja Beans, sown April 30 :—

Drills, 28 inches apart; length of stalk, 24 to 26 inches; not so many pods formed; yield per acre when cut green, 2 tons 1,920 pounds.

Plot 10—Soja Beans, sown April 30 :—

Drills, 35 inches apart; length of stalk, 24 to 26 inches; a few pods filled, but none ripened seed; yield per acre when cut green, 2 tons 640 pounds.

Plot 11—Horse Beans, sown April 30 :—

Drills 21 inches apart; length of stalk, 28 to 30 inches; very few pods formed and these were very short; yield per acre when cut green, 1 ton 440 pounds.

Plot 12—Horse Beans, sown April 30 :—

Drills 28 inches apart; length of stalk, 28 to 30 inches; very few pods and these not well filled; yield per acre when cut green, 1 ton 360 pounds.

Plot 13—Horse Beans, sown April 30 :—

Drills, 35 inches apart; length of stalk, 28 to 30 inches; a few short immature pods formed; yield per acre when cut green, 1 ton 640 pounds.

DWARF ESSEX RAPE.

Two plots were sown, one in drills, which was cultivated, the other was sown broadcast. Both plots were a comparative failure. The crop was cut and fed in September, and very little growth has been made up to the present time and no severe frosts have yet occurred.

SUNFLOWERS.

Two plots of sunflowers were sown May 11, one plot was sown in drills 30 inches apart and the other at 36 inches apart. The seed did not germinate well and the stand was scattered. The heads began to ripen early in September and as soon as the seed was well filled, in the earliest heads, the blue jays, robins and crows began to feed on them, and the best heads were destroyed before they were properly matured. There did not appear to be very much difference in the growth or size of the heads in either plot. The widest rows allowing more sunlight and air gave some ripened heads first, but the difference was not material and neither plot ripened at all evenly; some heads were fully ripened when others were only coming into bloom. On this account and because of the destruction of so much of the crop by the birds no accurate report can be made but as careful an estimate was made as was possible under the circumstances by counting the heads on a measured row, and weighing the seed from a number of average sized heads, and a conclusion reached that either plot would have produced about 1,200 pounds of clean seed per acre.

PASPALUM DILATATUM.

The plot of this grass from Australia which was reported on last year was winter-killed. There was nothing left this spring.

SAND VETCH.

This plant appears to be well adapted to this climate. The vines made a growth of over 5 feet, and blossomed freely, when cut the green crop weighed 8 tons 340 pounds; 1 ton 1,760 pounds cured. The horses and cattle do not care to eat it either cured or green.

MIXED GRAINS FOR FEED.

Several acres of mixed oats, pease and wheat were sown, part of it cut when the oats were in the dough and part left to ripen. The yield was good this year, curing a little over four tons of good feed per acre.

VEGETABLE GARDEN.

On account of the cold spring the vegetables and flower seeds sown in the garden made, as a rule, a poor stand and very slow growth. Those vegetables that require a rapid growth to produce the finest results, such as radish and lettuce, were rather poor.

LETTUCE.—Sown April 23.

Variety.	Fit for Use.	Remarks.
Forcing Milly	May 22	Leaves small; poor.
White Tennisball	" 26	Crisp and good.
Wheeler's Tom Thumb	" 22	Only medium.
Red-edged Victoria	" 29	Good.
Algiers	June 8	Crisp.
All the Year Round (black seed)	" 10	Crisp and sweet.
All the Year Round (white seed)	" 10	"
White Marvel of Cazard	" 16	White; crisp and tender.
Blond Stonehead	" 16	Large; medium.
Brown Stonehead	" 16	" crisp and sweet.
Early Ohio or Nonpareil	" 8	Medium.
Neapolitan	" 19	Crisp and good.
Marvel or Red Besson	" 20	Crisp, sweet, good.
Trocadero Red-edged or Big Boston	" 20	Very good.
Hammersmith	" 20	Only medium.
Hardy Red Winter	" 14	Leathery.
Green Paris Cos	" 18	Very fine.
White Paris Cos	" 18	Crisp and good.
Balloon	" 20	"
Trianon	" 20	"

CARROTS.—Sown April 17.

Parisian Forcing	July 11	Very fine quality.
French Horn	" 22	Very sweet; good.
Luc Half Long	" 28	Fine crisp; sweet.
Long Blood Red	Aug. 20	Very good.

CAULIFLOWER.—Sown in hotbed March 29; transplanted June 1

Early Snowball	July 27	Heads firm; good.
Extra Early Paris	" 24	" "
Extra Selected Earliest Dwarf Erfurt	Aug. 8	Heads small; firm.
Half Early Paris	" 14	Heads firm; good; large.
Chambourcy Mammoth	" 20	Heads large; open; poor.
Large Algiers	Sept. 6	Heads open; poor.
Autumn Giant	" 20	Heads solid; good.

CABBAGE.—Sown in hotbed March 29; transplanted May 30 and 31.

Express	Aug. 10	Heads small; firm; fair quality.
Paris Market	" 16	" " good.
Flat Parisian	" 22	" soft and small.
Very Early Etampes	" 18	" small; soft; poor.
Early Jersey Wakefield	" 18	" medium; firm; solid.
Extra Early Mid-summer Savoy	" 24	" " very solid; good.
Early Winningstadt	" 30	" large; solid; very good.
Drumhead St. John's Day	Sept. 14	" " very regular heads.
Fottler's Improved Brunswick	" 14	" " " "
Red Large Drumhead	" 20	Large and very solid heads.
Red Polish Shortstem	" 20	Medium size "
Green Globe Savoy	" 20	" " "

BRUSSELS SPROUTS.—Sown in hotbed March 29; transplanted May 30.

Half Dwarf Paris Market	Oct. 10	Did not grow well.
Dwarf Improved	" 20	Very poor.

BROCOLI.—Sown in hotbed March 29; transplanted May 30.

Variety.	Fit for Use.	Remarks.
Extra Early White	Oct. 6	Heads small; open.
Large White Mammoth	" 20	" medium.

BEETS.—Sown April 17; fit for table July 6.

Egyptian	July 6	A quick grower; fine flavour.
Nutting's Dwarf Improved	" 9	" " " good colour.
Early Blood Red Turnip	" 16	" " " "
Long Smooth Blood Red	Aug. 8	Smooth: slender; dark red; good.
Dell's Black Leaf	" 12	" " " very fair.

TABLE TURNIPS.—Sown April 17. A fine even stand in all these turnips.

Extra Early White Milan	June 13	Crisp; sweet; pleasant; good size.
Early White Strap Leaved	" 17	" " " " flavour.
Half Long Early White Vertus	" 17	Medium grower; poor quality.
Early Stone	" 24	Crisp; solid; fine quality
Yellow Robertson's Golden Ball	" 24	" rich; fine quality and flavour.

RADISHES.—Sown April 16. Fit for table June 1.

Forcing Turnip Scarlet	June 1	Crisp; sweet.
Forcing Scarlet White Tipped	" 1	" good.
Forcing Deep Scarlet	" 1	Crisp; good; sweet.
Forcing Deep Scarlet Shortleaf	" 1	Medium crisp.
Forcing White	" 6	Crisp; juicy.
Early Scarlet Turnip	" 8	" " pleasant.
Early Scarlet White Tipped Turnip	" 8	" " very good.
Deep Scarlet Turnip	" 14	" good.
Very Early Yellow Turnip	" 6	Not crisp; a little tough.
Olive Shaped Scarlet	" 14	Tough and stringy.
Olive Shaped Scarlet White Tipped	" 20	Medium crisp; pleasant.

WINTER RADISH.—Sown June 16; pulled November 10.

Winter Russian, large, crisp, fine flavour.
Winter Black Long Spanish, large, sweet, crisp, good.
Winter Scarlet China, medium large, crisp, sweet.

BEANS.—Planted April 17.

Variety.	Fit for Table.		Remarks.
King of the Wax Beans	July	11	Vines small, not productive; pods 2 to 3 inches long crisp, good flavour; ripe Sept. 4.
Fame of Vitry	"	22	A moderate grower, productive; pods 4 to 6 inches long, crisp, good; ripe Sept. 8.
Dwarf, Emperor of Russia	"	26	A medium grower, productive; pods 3 to 5 inches long, crisp, fine flavoured; ripe Sept. 11.
Dwarf, Golden	"	26	A strong grower and productive; pods 3 to $4\frac{1}{2}$ inches long, crisp, fine quality; ripe Sept. 8.
French Dwarf, Extra Early	"	24	Vines short, not productive; pods 3 to 4 inches long, good flavour; ripe Sept. 11.
Flageolet, Black Speckled	"	24	A medium grower and productive; pods $3\frac{1}{2}$ to 5 inches long, crisp, pleasant flavour; ripe Sept. 24.
Canadian Wonder	"	21	Vigorous grower and productive; pods 4 to 6 inches long, plump, crisp, good flavour; ripe Oct. 4.

TABLE CORN.—Planted May 22.

Variety.	Fit for Table.	Remarks.
Early White Cory	Sept. 15	Ears 6 inches long, well filled ; good quality.
Early Crosby Sugar	October 22	Ears short, not well filled ; good quality.
Stowell's Evergreen	" 30	Good ears, well filled but very late.
Perry's Hybrid	" 30	Ears short and only in early milk when cut.
New Champion Sugar	" 23	Ears short and poor ; a poor variety.
Nonsuch Sugar		Early milk when cut, Nov. 3.
Country Gentleman		" " "
Pop Corn		Stalks 5 feet high and 2 to 3 ears of 6 inches long on each stalk.

CELERY.—Sown in hotbed, March 29 ; transplanted to garden June 4.

Variety.	Fit for Use.	Remarks.
Rose Ribbed Paris	Sept. 4	Poor flavour.
Paris Golden Yellow	October 1	Good quality.
Giant Pascal	" 13	Coarse and stringy.
Red Large Ribbed	" 10	Coarse and poor.

GARDEN PEASE.—Sown May 18.

Variety.	Fit for Table.	Size of Pea.	Length of Pod.	Remarks.
			Ins.	
American Wonder	June 16	Medium	$2\frac{1}{4}$	Vines well loaded ; good quality.
Alaska	" 21	Small	2	" " "
Nott's Excelsior	" 21	"	$2\frac{1}{2}$	" " "
McLean's Advance	July 2	Medium	$2\frac{1}{2}$	Not well loaded ; fair quality.
Pride of the Market	" 6	Large	$3\frac{1}{2}$	Vines well podded ; good flavour.
Admiral	" 14	Small	$3\frac{1}{2}$	A medium crop ; fair quality.
Duke of Albany	" 10	Large	$3\frac{1}{2}$	Well loaded ; extra fine quality.
Shropshire Hero	" 12	Medium	4	" good quality.
Telephone	" 10	Large	4	Medium crop ; "
Stratagem	" 12	"	$3\frac{1}{2}$	" "
New Dwarf, Telephone	" 15	"	4	Well podded ; "
Heroine	" 16	"	4	" "
Champion of England	" 20	"	3	Medium crop ; "
Gradus	" 21	"	3	" "

ONIONS.—Sown April 13.

Variety.	Remarks.
James Keeping	Very few of the seeds germinated ; no crop.
White Dutch	" " " a few small onions.
Weathersfield Large Red	The only one that made bottoms ; 110 bush. per acre.
Blood Red	A few bottoms, but most of the poor crop was necks.
Market Favourite Keeping	Very few bottoms ; a few small soft onions.
Danvers Yellow Globe	Seed grew well, but the crop failed to bottom.
Trebon's Large Yellow	Seed failed to grow ; no crop.
Straw Coloured White Spanish	Seed grew well, but roots very small ; no bottoms.
Paris Silverskin	Very few onions, but a good sample of the sort.

SQUASH.—Planted May 1.

Variety.	Fit for Use.	Remarks.
Summer Crookneck	August 15	Vines not productive; squash small and watery.
Early White Scallop	" 13	Not productive; quality good; flavour good.
The Warren	" 10	Vines vigorous and moderately productive; largest squash 11 lbs.; flesh thick, rich, yellow, dry and good.
Extra Early Orange	" 16	Vines vigorous and productive; flesh thick, rich, yellow and very fine flavour; largest squash 9½ lbs.
Hubbard	Sept. 1	Vines vigorous and medium productive; flesh thick, rich, dry and good; heaviest squash 11¾ lbs.
Faxon	" 6	Vines vigorous but not productive; not high quality; largest squash 15½ lbs.
Mammoth Chili	October —	Vines very vigorous and productive; too coarse for table use; largest squash 43 lbs.
Perfect Gem	August 20	Vines very vigorous and productive; quality good; largest squash 6 inches in diameter.

PUMPKINS.—Planted May 2.

Variety.	Remarks.
Mammoth Tom	Vines very vigorous and productive; pumpkins large, oblong, heavy.
Quaker Pie	Vines medium, vigorous and only moderately productive; fruit medium or below in size, round, flattened, good quality.
Winter Luxury	Vines very vigorous and productive; fruit small, orange yellow round, of good quality; fit for use August 10.
Golden Marrow	Vines vigorous and productive; fruit large, golden orange, flesh deep, fine quality; ripe August 20.
Large Cheese	Vines medium growers, vigorous, not productive; fruit large, very thick fleshed, fair quality; fit for use August 30.
Calhoun	Vines medium in vigour and productiveness; flesh very thick, but cracks late in the season; ripe September 20.

DISTRIBUTION OF SEED SAMPLES.

This branch of the work is increasing rapidly and the interest shown in it is good evidence that those who take care to save the produce of the samples received are in many instances benefited.

In a province of such area and great diversity of climate as British Columbia many samples are not a success, but many are, and where one sample proves successful the grower is soon able to supply neighbours with seed.

One farmer reports 740 lbs. of potatoes from a three lb. sample of American Wonder, and from 130 lbs. to 200 lbs. was quite a common return from a 3-lb. sample this year.

Packages of scions	241
Packages of nuts	97
Packages of small fruit	131
3 lb. samples potatoes	259
3 lb. samples pease	87
3 lb. samples oats	246
3 lb. samples barley	184
3 lb. samples wheat	168

The correspondence of the farm is increasing, the number of letters received this year was 2,518, and the answers sent out 2,378

APPLES.

Wet weather was almost continuous with cold north winds and occasional light frosts during the blossoming period, and this was no doubt the cause of a comparative failure in all the tree fruits this year.

Fruit trees of all sorts bloomed very profusely and having made a vigorous growth last year should if the weather had been favourable, have given a heavy crop of all sorts.

In the following notes will be found short descriptions of those varieties which fruited this year for the first time :

Lord Suffield.—Tree a very vigorous grower and an early bearer. Fruit medium to large, smoothly conical. Skin light yellow, with a pale blush, flesh whitish, soft, rather coarse, mildly acid. Season August.

Early Rivers.—Tree a medium grower and an early producer. Fruit large, oblong and tapering to the eye. Skin yellowish white. Flesh white, soft, rather coarse; sprightly acid, juicy. Season August.

Domino.—Tree a medium grower and an early bearer. Fruit above medium size, globular tapering slightly to the eye. Skin yellowish white, with a pink blush. Season August.

Red Summer Peach.—Tree a strong grower. Fruit of medium size round, tapering to the eye ; skin golden yellow, nearly covered with bright red. Flesh soft, crisp, white, mildly acid, with a pleasant flavour. Season August.

Beautiful Arkad.—Tree a strong and healthy grower. Fruit of medium size, oblong, conical ; skin clear golden yellow, with a pale reddish blush. Flesh white, crisp, juicy, with a pleasant flavour, mildly acid. Season August.

Lubsk Queen.—Tree a strong grower. Fruit large, oblong, conical ; skin yellowish, nearly covered with splashes of bright red and a thin whitish bloom. Flesh white, crisp, juicy, mildly sub-acid, or nearly sweet. Season August.

Madam Niemetz.—Tree a vigorous grower. Fruit of medium size, round, flat; skin green, streaked with dull red. Flesh greenish white, firm, juicy, mildly sub-acid, with a pleasant flavour. Season August.

Taarenborg.—Tree a vigorous open spreading grower. Fruit of medium size ; skin greenish yellow, with a pale blush on sunny side. Flesh white, a little coarse, juicy, crisp, mildly acid, with a pleasant flavour. Season August.

Red Pigeon.—Tree a vigorous grower and an early bearer. Fruit of medium size, conical ; skin yellow, striped and splashed with two shades of red. Flesh white, crisp, moderately juicy, mildly acid, with a pleasant flavor. Season August.

Orange.—Tree a medium grower. Fruit of medium size, flattish, tapering a little to the eye; skin greenish yellow, with a faint, dull red blush. Flesh white, soft, juicy, sub-acid. Season August.

Red Summer Calville.—Tree a medium grower. Fruit small, conical, inclined to scab ; skin greenish yellow with stripes of dull red, flesh greenish white, soft, juicy, with a pleasant flavour; sub-acid. Season August.

Drap d'Or.—Tree a moderate grower. Fruit above medium size, roundish, oblate ; skin dull greenish yellow with numerous small brown dots. Flesh yellowish, crisp, moderately juicy and mildly acid. Season August.

Gold Prince.—Tree a vigorous grower. Fruit large, oblong, tapering slightly to eye ; skin whitish golden, striped with bright clear red. Flesh yellowish, tender, mildly sub-acid ; not juicy. Season August.

Transparent de Croncelles.—Tree a strong grower and early bearer. Fruit large globular ; skin yellowish white, with a pink flush on sunny side. Flesh coarse, yellowish, moderately juicy and mildly acid. Season August.

Cove.—Tree a moderate grower. Fruit of medium size, oblate ; skin green, nearly covered with dull red, and small patches of russet. Flesh white, tender, with a pleasant flavour, mildly acid. Season August.

Striped July.—Tree a slow grower. Fruit of medium size, conical ; skin yellow, freely splashed and striped with red. Flesh white, juicy, tender, with a pleasant flavour sub-acid. Season August.

Early Joe.—Tree a slow grower. Fruit small, oblate, tapering a little to eye ; skin greenish yellow, splashed with red. Flesh white, crisp, fine grained, of a pleasant flavour, mildly acid. Season August.

Sylvan Sweet.—Tree a medium grower and an early bearer. Fruit small, roundish, oblate ; skin yellow nearly covered with bright red ; flesh yellowish, crisp, not juicy, but sweet, with a pleasant flavour. Season August.

White Transparent.—Tree a vigorous grower. Fruit of medium size, roundish, conical; skin dull yellow, with stripes and splashes of pale red. Flesh white, soft moderately juicy ; mildly sub-acid, with a pleasant flavour. Season August.

Moscow.—Tree a slow grower. Fruit of medium size, roundish ; skin greenish yellow, with a dull red cheek. Flesh white, juicy, soft, mildly sub-acid, with a pleasant flavour. Season August.

Raspberry.—Tree a moderate grower. Fruit of medium size, conical ; skin golden yellow, striped and splashed with bright red. Flesh white, crisp, tender, juicy, mildly sub-acid, with a pleasant flavour. Season August.

Late Duchess.—Tree a medium grower. Fruit small, oblong, conical ; skin yellowish white, lightly striped with red. Flesh yellowish, moderately juicy, soft, tender, sweet. Season August.

Early Ripe.—Tree a vigorous grower. Fruit of medium size, roundish, conical, skin greenish yellow, with a pale reddish blush. Flesh white, crisp, moderately juicy, mildly acid, with a pleasant flavour. Season August.

Colton.—Tree a vigorous grower and an early bearer. Fruit of medium size, oblong, conical ; skin yellow with a purple flush nearly over the whole surface. Flesh white, firm, juicy, sub-acid, with a good flavour. Season early October.

Hibernal.—Tree a vigorous and healthy grower. Fruit large, conical ; skin greenish with a red cheek. Flesh white, crisp, juicy, a little coarse, mildly acid. Season September.

Early Golden Margaret.—Tree a medium grower. Fruit of medium size, oblong, conical ; skin yellowish white. Flesh yellowish, firm, crisp, juicy, with a pleasant flavour and mildly acid. Season September.

Marseilles Summer.—Tree a medium grower. Fruit of medium size, conical ; skin yellow, with a reddish blush on the sunny side. Flesh white, moderately juicy, crisp, mildly acid, with a pleasant flavour. Season September.

Cousinot Purple Red.—Tree a free grower. Fruit small to medium, oblong conical ; skin green with streaks and splashes of dull red. Flesh white, crisp, firm, moderately acid. Season October.

Autumn Short Stem.—Tree a poor grower. Fruit small, round, flattened ; skin greenish with many whitish dots and a faint reddish blush on the sunny side. Flesh greenish white, juicy, crisp, mildly acid, with a pleasant flavour. Season September.

Langtons.—Tree a strong grower and an early bearer. Fruit of medium size, globular, slightly flattened at stem and calyx ; skin yellowish green, splashed with two shades of red and many white dots, and with a little russet about the stem. Flesh white, firm, juicy, fine grained, mildly acid with a pleasant flavour. Season early September.

Peasgoods Golden Reinette.—Tree a vigorous grower and an early bearer. Fruit of medium size, conical ; skin smooth golden yellow, with a red cheek. Flesh yellowish, juicy, crisp, mildly acid, with a pleasant flavour. Season October.

Bostic Queen.—Tree a medium grower. Fruit of medium size, oblate, conical, skin green with a dull red cheek and many grey dots. Flesh yellowish, firm, juicy, mildly sub-acid with a pleasant flavour. Season October.

Barloff.—Tree a strong grower. Fruit small, conical ; skin green with a dull red cheek. Flesh white, moderately juicy, mildly acid, with a pleasant flavour. Season October.

Orleans Reinette.—Tree a medium grower and an early bearer. Fruit small to medium, conical; skin greenish yellow, with a little russet about the stem, and a reddish blush on the cheek. Flesh white, firm, crisp, juicy, sprightly acid. Season October.

Harvest Reinette.—Tree a medium grower. Fruit of medium size, oblong, tapering a little to the eye ; skin greenish russet, with a little bronzy blush. Flesh white, firm, juicy, mildly acid, with a pleasant flavour. Season October.

Staar.—Tree a strong grower. Fruit of medium size, oblate ; skin greenish yellow, with many grey dots. Flesh white, crisp, juicy, sprightly, with a pleasant flavour. Season October.

Gideon's No. 30.—Tree a vigorous grower. Fruit above medium size, oblate, handsome ; skin greenish yellow, striped and splashed with bright red. Flesh white, crisp, juicy, mildly acid, is liable to rot at the core. Season October.

Painted Lady.—Tree a medium grower. Fruit above medium size, conical ; skin, greenish white with a dull red cheek, sprinkled with white dots, and covered with a thin whitish bloom. Flesh yellowish white, firm, moderately juicy, coarse grained, mildly acid with a pleasant flavour. Season October.

Golden Noble.—Tree a medium grower. Fruit above medium size, oblate ; skin greenish yellow, sprinkled with many whitish dots. Flesh white, juicy, firm, mildly sub-acid, with a pleasant flavour. Season October.

Landsburg Reinette.—Tree a strong grower. Fruit medium size, irregular, conical, rather knotty ; skin green with patches of russet about the stem. Flesh white, moderately juicy, firm, sub-acid, inclined to water core and spoil before fully ripe. Season October.

Dr. Seelig's Orange.—Tree a strong grower. Fruit of medium size, globular tapering a little to the eye ; skin greenish yellow. Flesh white, firm, juicy, sprightly not high flavoured, is liable to water core. Season October.

Enormous.—Tree a strong and spreading grower. Fruit medium to large, obtuse, conical, irregular in size and shape ; skin dull yellow, with a little russet about the stem. Flesh yellowish white,. coarse granular, moderately juicy, sub-acid. Season October.

Thompson's Seedling, No. 66.—Tree a strong, spreading grower. Fruit of medium size, oblate, slightly conical ; skin green, nearly covered with orange and splashed with bright red. Flesh yellowish white, firm, crisp, fine grained, with a pleasant flavour. Season October.

Thompson's Seedling, No. 46.—Tree a strong grower. Fruit medium to above medium size, oblate ; skin greenish yellow, shaded with dull red and having a sprinkling of gray dots. Flesh white, fine grained, juicy, sprightly, with a fine and pleasant flavour. Season October.

Thompson's Seedling, No. 24.—Tree a vigorous grower. Fruit of medium size, conical. Skin yellowish green, with a red blush. Flesh white, juicy, crisp, sub-acid, with a pleasant flavour. Season October.

Colfax.—Tree a strong grower and an early bearer. Fruit above medium size, oblong, globular ; skin yellowish green, nearly covered with deep red. Flesh crisp, juicy, sub-acid, with a pleasant flavour. Season October.

Filippa.—Tree a medium grower. Fruit of medium size, oblong; skin yellow, with an orange reddish cheek, and many russet dots. Flesh white, tender, fine grained, mildly acid, with a fine pleasant flavour. Season October.

Henzen's Pearmain.—Tree a strong grower. Fruit of medium size, roundish globular ; skin green, nearly covered with dull red. Flesh white, crisp, mildly acid, moderately juicy, with a pleasant flavour. Season October.

The Queen.—Tree a moderate grower and an early bearer. Fruit large, oblate ; skin greenish yellow, splashed and streaked with bright red. Flesh white, firm, juicy, crisp, with a good flavour ; mildly acid. Season October.

Cellini.—Tree a fair grower and free producer. Fruit of medium size, oblong, slightly conical ; skin greenish yellow, nearly overspread with deep red. Flesh white, crisp, juicy, often stained with red, mildly acid, with a pleasant flavour. Season October and November.

Arnold's Beauty.—Tree a strong and upright grower. Fruit of medium size, oblate, tapering slightly to eye; skin clear yellow, with a bright red cheek. Flesh yellowish, fine grained, juicy, mildly sub-acid, with a pleasant aromatic flavour. Season October and November.

Pioneer.—Tree a moderate grower. Fruit of medium size, round, flattened at the ends; skin yellow, with a light red cheek. Flesh yellowish, tender, juicy, sub-acid, with a pleasant flavour. Season October and November.

Orange Pippin.—Tree a vigorous grower. Fruit of medium size, oblate ; skin greenish yellow, with a few white dots. Flesh yellowish white, juicy, tender, fine grained, mildly acid, with a pleasant flavour. Season October and November.

Golden Ball.—Tree a strong grower. Fruit of medium size, conical, skin yellow with patches of russet about the stem. Flesh yellow, firm, fine grained, juicy, sub-acid, with a pleasant flavour. Season November.

Early Almond.—Tree a strong grower and an early bearer. Fruit of medium size, round. Skin yellow striped and splashed over nearly the whole surface with light and dark red. Flesh white, firm, juicy, fine grained, mildly acid with a pleasant flavour. Season November.

Sanspareil.—Tree a vigorous grower and an early bearer. Fruit of medium or below medium size, oblong, ribbed. Skin yellowish-green with a reddish tint, and a few small streaks of red on the sunny side, Flesh white, firm, juicy, mildly sub-acid. Season October and November.

Claudius.—Tree a vigorous grower. Fruit small, round, flattened. Skin greenish-yellow. Flesh whitish, firm, juicy, sub-acid with a pleasant flavour. Season November and December.

Green Reinette.—Tree a medium grower and an early bearer. Fruit small, conical. Skin nearly covered with a dull reddish russet. Flesh greenish-white, firm, juicy sub-acid. Season November and December.

Red Reinette.—Tree a free grower. Fruit above medium size, oblong, conical, skin greenish-yellow, with a purple red cheek on the sunny side, and sprinkled with white dots, a handsome fruit. Flesh yellowish, juicy, firm, fine grained, mildly acid with a pleasant flavour. Season November and December.

Cossenza.—Tree a strong grower and an early bearer. Fruit small globular ; skin greenish-yellow, with patches of russet. Flesh yellowish, firm, moderately juicy, sweet, with a pleasant flavour. Season November and December.

Marie.—Tree a medium grower. Fruit of medium size, roundish oblong ; skin green, splashed on the sunny side with streaks of bright red. Flesh white, firm, juicy, sub-acid. Season December.

Ildrod Pigeon.—Tree a medium grower. Fruit small, conical; skin green, with a dull red cheek and a few gray dots. Flesh white, juicy, fine-grained, mildly acid, with a fine pleasant flavour. Season November and December.

Cranberry Seedling.—Tree a strong and upright grower, but slow in coming into bearing. Fruit small, roundish, conical ; skin yellow, with sometimes a faint blush and a few whitish dots. Flesh white, firm, medium juicy, sweet, with a pleasant aromatic flavour. Season November and December.

Muscat Reinette.—Tree a vigorous grower and an early bearer. Fruit of medium size, oblate, tapering slightly to the eye ; skin yellow, covered with a reddish-russet, and splashed with deep red. Flesh yellowish, firm, juicy, mildly acid, with a fine pleasant flavour. Season December.

Ewalt.—Tree a strong grower and an early bearer. Fruit large, roundish, conic; skin bright yellow with a blush on the sunny side. Flesh white, tender, juicy, sprightly, with a good flavour. Season December.

McKinley.—Tree a vigorous grower and an early producer. Fruit below medium size, roundish flattened, skin greenish-yellow, nearly covered with dull red. Flesh white crisp, fine grained, juicy, mildly acid, with a pleasant flavour. Season December.

Forest.—Tree a slow grower and a poor bearer. Fruit of medium size, oblong conical, ribbed, skin yellow nearly covered with dull red and sprinkled with gray dots. Flesh yellow, crisp, nearly sweet, juicy with a pleasant, somewhat aromatic flavour. Season December.

Barton's Favourite.—Tree a vigorous grower and an early producer. Fruit small, conical, skin green, nearly covered with dull red and sprinkled with white dots. Flesh white, firm, juicy, sub-acid. Liable to be scabby. Season December.

Red Eiser.—Tree a strong grower. Fruit of medium size, conical, skin green with a deep red blush on the sunny side, and many white dots. Flesh greenish white, firm, fine grained, spicy, good. Season December.

Dutch Golden Pippin.—Tree a moderate grower. Fruit below medium size, globular, skin dull greenish-yellow. Flesh yellowish white, firm, fine grained, juicy with a pleasant flavour. Season December and January.

Little Red Winter.—Tree a slow and slender grower. Fruit below medium size, oblate conical, skin greenish-yellow striped and splashed with red. Flesh firm, white, juicy, mildly acid with a pleasant flavour. Season December.

Zuzoff Winter.—Tree a medium grower. Fruit of medium size, oblong, tapering a little to the eye; skin green, nearly covered with dull purple red, and scabby. Flesh white, juicy, firm, sprightly. Season December.

Virginia Queen.—Tree a slow grower. Fruit small, conical; skin green, nearly covered with bright purple red. Flesh greenish, firm, moderately juicy, mildly acid. Season December.

Rudolph's Borsdorfer.—Tree a medium grower. Fruit small, round, flattened; skin greenish-yellow, with a faint blush. Flesh white, juicy, crisp, sub-acid, with a pleasant flavour. Season December.

Shirk.—Tree a strong grower. Fruit of medium size, conical; skin green, with a small red cheek on the sunny side. Flesh white, juicy, fine grained, mildly acid, with a pleasant flavour. Season December.

Windsor Chief.—Tree a medium grower. Fruit large, globular, ribbed, and slightly conical; skin green, nearly covered with dull red and sprinkled with whitish dots. Flesh greenish-white, firm and juicy, with a pleasant flavour; nearly sweet. Season December.

Bloomless.—Tree a medium grower. Fruit below medium in size, globular; skin greenish-white, with a few small patches of dull red and a whitish bloom. Flesh firm, white, juicy, fine grained, sweet with a pleasant flavour. Season December.

Golden Winter Pearmain.—Tree a vigorous grower and an early bearer. Fruit of medium size, conical; skin orange-russet, with a little red on the sunny side. Flesh juicy, yellowish-white, firm, sub-acid and of fine flavour. Season December.

New English Pigeon.—Tree a strong grower. Fruit below medium size, conical ; skin green, nearly overspread with dull red. Flesh white, juicy and sprightly. Season December.

Seaton House.—Tree a vigorous grower, and an early bearer. Fruit of medium size, oblate, tapering to the eye; skin clear golden yellow, with streaks of light and dark red. Flesh yellowish, firm, moderately juicy, sub-acid, with a pleasant flavour. Season December and January.

Golden Queen.—Tree a strong grower and an early bearer. Fruit of medium size, oblong, conical irregularly ribbed ; skin yellow with an orange red cheek, and a few greenish dots. Flesh whitish, firm, juicy, mildly acid, with a pleasant flavour. Season December.

Gill's Beauty.—Tree a moderate grower. Fruit large, globular, tapering a little to the eye ; skin green, striped and splashed with red. Flesh white, firm, moderately juicy, mildly acid, with a pleasant flavour. Season December.

Pickard's Reserve.—Tree a medium grower. Fruit of medium size, oblate ; skin a russet yellow, with a small red blush on sunny side, and a few gray dots. Flesh juicy, yellowish, firm, sub-acid, with a pleasant aromatic flavour. Season December.

Harrison.—Tree a strong grower and an early bearer. Fruit of medium size, globular, tapering a little to the eye ; skin greenish-yellow, with a small red blush in the sun. Flesh white, moderately juicy, firm, mildly acid. Season winter.

Oberdick's Pearmain.—Tree a medium grower. Fruit of medium size, oblong, globular, tapering a little to the eye; skin green with a dull red cheek and a few splashes of brighter red. Flesh white, firm, juicy, sub-acid, with a fine spicy flavour. Season winter.

Deak's Winter Calville.—Tree a strong grower. Fruit large, conical, deeply ribbed ; skin greenish-yellow with a few whitish dots. Flesh white, firm, juicy, mildly acid, pleasant flavour. Season winter.

Steednicne.—Tree a vigorous grower. Fruit small, conical; skin greenish-yellow. Flesh white, firm, juicy, sub-acid, with a pleasant flavour. Season winter.

Flintinge.—Tree a strong grower. Fruit of medium size, oblong, conical ; skin yellow, with a red cheek and small stripes of light red. Flesh yellowish, juicy, firm, fine-grained, with a pleasant flavour. Season winter.

Boiken.—Tree a strong grower. Fruit of medium size, irregularly ribbed, conical; skin greenish with a red cheek and many white dots. Flesh white, firm, juicy, mildly acid with a pleasant flavour. Season winter.

Red Winter Sweet.—Tree a medium grower. Fruit of medium size, round conical; skin greenish-yellow, with streaks and patches of bright red. Flesh yellowish, a little coarse, moderately juicy, very sweet. Season winter.

Martha Washington.—Tree a strong grower. Fruit of medium size, oblong, globular ; skin yellowish green, with a few patches of dull red. Flesh greenish-white, juicy, mildly acid, with a pleasant flavour. Season winter.

Allen's Russet.—Tree a strong grower. Fruit small, conical ; skin grayish-russet, with a blush on the sunny side. Flesh white, crisp, juicy, mildly acid, with a pleasant flavour. Season winter.

Springdale.—Tree a strong grower. Fruit small, globular ; skin green, nearly overspread with dull purple, and sprinkled with gray dots. Flesh greenish white, firm, juicy, mildly acid, inclined to scab. Season winter.

Bright Water.—Tree a strong grower. Fruit of medium size, conical ; skin green, with large patches of russet and a red blush on the sunny side. Flesh white, firm, moderately juicy, nearly sweet. Season winter.

Aiken.—Tree a vigorous grower. Fruit of medium size, globular ; skin green, with a red cheek and stripes of red over nearly the whole surface. Flesh yellowish-white, juicy, rather acid. Season winter.

Yates Winter.—Tree a vigorous grower. Fruit small, conical ; skin green with a few stripes of red and many white dots, and a thin whitish bloom. Flesh greenish white, firm, juicy, mildly acid, with a pleasant flavour. Season winter.

Court Pendu Royal.—Tree a vigorous grower. Fruit of medium size, flat; skin greenish-yellow, nearly covered with deep red. Flesh yellowish, crisp, moderately juicy, sprightly acid. Season winter.

Pomme Grise.—Tree a slender medium grower. Fruit small, roundish, oblate; skin greenish gray, with russet and a small blush in the sun. Flesh white, tender, moderately juicy, with a rich flavour. Season winter.

Wandering Spy.—Tree a strong and spreading grower. Fruit of medium size, oblate ; skin greenish-white with a dull red cheek in the sun. Flesh greenish-white, firm, juicy, mildly acid, with a pleasant aromatic flavor. Liable to scab. Season winter.

Winter-Green.—Tree a strong grower. Fruit above medium in size, oblate, slightly conical ; skin russet-yellow. Flesh yellowish, moderately juicy, sub-acid with a pleasant flavour. Season winter.

Danver's Winter Sweet.—Tree a slow grower. Fruit small to medium, oblong, conical ; skin smooth dull yellow with a red cheek. Flesh yellow, firm, sweet with a fine flavour. Season winter.

Lord Nelson.—Tree a medium grower. Fruit small, conical ; skin greenish-yellow with a faint blush on the sunny side. Flesh yellowish, crisp, moderately juicy, mildly acid, often deformed and scabby. Season winter.

Babbit.—Tree a strong grower. Fruit below medium size, conical ; skin greenish-yellow, with a dull red cheek on the sunny side. Flesh white, firm, moderately juicy, somewhat acid, often scabby and deformed. Season winter.

Hyfill.—Tree a strong healthy grower. Fruit small, oblate, conical ; skin greenish, with purple nearly over the whole surface, and a few white dots. Flesh greenish-white, firm, juicy, mildly acid, with a pleasant flavour. Season winter.

North Carolina Limber Twig.—Tree a medium grower. Fruit of medium size, conical ; skin green, with purple over nearly the whole surface. Flesh white, firm, juicy, nearly sweet with a pleasant flavour. Season winter.

Edeldorfer.—Tree a strong grower. Fruit small, globular, tapering slightly to the eye ; skin yellowish-white, with a reddish cheek and a few whitish dots. Flesh yellowish, firm, juicy, mildly acid, with a pleasant flavour. Season Winter.

Red Winter Tauben.—Tree a strong grower. Fruit below medium size, conical ; skin green with a red cheek and many white dots. Flesh white, firm, juicy, mildly sub-acid, with a pleasant flavour. Somewhat scabby. Season winter.

Black Annette.—Tree a vigorous grower. Fruit small, roundish, conical ; skin green, with dark red nearly over the whole surface. Flesh firm, not juicy, sub-acid. Season winter.

Maxey.—Tree only a moderate grower. Fruit of medium size, roundish, slightly conical ; skin green with a red cheek and a few stripes of dull red, and sprinkled with white dots. Flesh greenish-white, firm, mildly acid. Season winter.

Cranberry Winter.—Tree a moderate grower. Fruit small, conical ; skin yellow, with a little red on the sunny side. Flesh white, firm, moderately juicy, with a pleasant flavour. Season winter.

Parker's Pippin.—Tree a strong grower. Fruit below medium size, globular, slightly conical ; skin orange-russet, with occasionally a blush on cheek. Flesh white, juicy, mildly acid, with a pleasant flavour. Season winter.

Spanish Borsdorf.—Tree a vigorous grower. Fruit large, roundish, conical ; skin greenish white with many gray dots. Flesh white, crisp, juicy, mildly sub-acid, firm, and of good flavour.. Season winter.

Bauman's Reinette.—Tree a vigorous grower and an early bearer. Fruit small to medium, roundish oblate ; skin greenish-yellow, with a reddish blush and a few brown dots. Flesh yellowish, juicy, firm, fine-grained, nearly sweet, of good flavour. Season winter.

Red Winter Pigeon.—Tree a moderate grower. Fruit of medium size, conical ; skin greenish-yellow, with a small red cheek and many white dots. Flesh white, firm, sprightly, acid. Season winter.

Lincoln.—Tree a strong grower. Fruit medium to large, oblate, conical ; skin greenish-yellow, with a bright red blush and a few grayish dots. Flesh white, firm, moderately juicy, mildly acid, with a pleasant flavour. Season winter.

Palmer Greening.—Tree a vigorous grower and an early bearer. Fruit above medium size, roundish, oblate ; skin yellowish-green, with a clear red cheek and many grey dots. Flesh white, crisp, juicy, sub-acid, with a pleasant aromatic flavour. Season winter.

Brownlee's Russet.—Tree a vigorous grower. Fruit medium to large, roundish flattened ; skin green with a dull russet-red cheek. Flesh greenish-white, tender, juicy, aromatic, sweet. Season winter.

Nelson Sweet.—Tree a vigorous grower and early bearer. Fruit of medium size, roundish, flattened ; skin dull greenish-yellow, with a bronze-red cheek. Flesh yellowish, firm, moderately juicy, sweet. Season winter.

New Berner Rose.—Tree a strong grower. Fruit small, conical; skin greenish yellow, with splashes of dull red in the sun, and small whitish dots. Flesh greenish white, juicy, firm, sprightly, acid. Season winter.

Aushaulder.—Tree a medium grower. Fruit of medium size, conical; skin greenish yellow, nearly overspread with dull red and with many white dots. Flesh greenish white, firm, juicy, mildly acid. Season winter.

Spath's Seedling.—Tree a vigorous grower. Fruit of medium size, oblong conical; skin green, nearly overspread with a deep red and a few white dots. Flesh white, juicy, firm, mildly acid. Season winter.

Chelmsford Wonder.—Tree a vigorous grower. Fruit above medium size, oblate, globe-shaped, ribbed; skin yellow, with a pink cheek and sprinkled with carmine dots. Flesh yellowish, firm, a little coarse, moderately juicy, mildly acid. Season winter.

Himbeer.—Tree a medium grower. Fruit small, globular; skin greenish white, with a little red on the sunny side. Flesh white, crisp, moderately juicy, sweet. Season winter.

Calville Oberslebener.—Tree a strong grower. Fruit small, round, obtuse, conical; skin yellow with a bright clear, red cheek. Flesh yellowish, crisp, moderately juicy, with a pleasant flavour. Season winter.

Brakefield Seedling.—Tree a strong grower and early bearer. Fruit small, oblate, conical; skin yellow, splashed with two shades of red. Flesh white, firm, juicy crisp, with a fine aromatic flavour, nearly sweet. Season winter.

Nor-western Greening.—Tree a strong grower and early producer. Fruit of medium size, globular, tapering a little to the eye ; skin greenish-yellow. Flesh white, fine-grained, juicy, mildly acid, with a pleasant flavour. Season winter.

Kennedy Seedling.—Tree a strong grower and free producer. Fruit of medium size, irregularly globe shaped; skin greenish-yellow, nearly covered with deep red and sprinkled with a few white dots. Flesh white, often stained with red, crisp, juicy, sub-acid, with a pleasant flavour. Season winter.

Lady Finger.—Tree a vigorous grower. Fruit of medium size, oblong, conical ; skin yellow, freely splashed with red and sprinkled with brown dots. Flesh whitish, firm, not juicy, nearly sweet. Season winter.

Norcia.—Tree a moderate grower. Fruit small, conical; skin yellow, nearly covered with streaks and splashes of red in two shades. Flesh white, firm, juicy, mildly acid, with a pleasant flavour. Season winter.

Counsillor Niemetz.—Tree a vigorous grower. Fruit of medium size, round, flat; skin greenish-yellow, with red over nearly the whole surface, and a few whitish dots, Flesh yellowish-white, juicy, tender, mildly acid, with a pleasant aromatic flavour. Season winter.

PEARS.

The same cause that prevented the blossoms on the apple trees from setting, affected the pears also. Many of the young trees and all of the old ones were full of bloom, but very few had any fruit, the blossoms falling without forming fruit at all.

The Bartlett, Vicar of Winkfield and the Keiffer gave light crops, and the Beurre Clairgeau had a few specimens. These formed the larger part of the crop on the older trees. The following pears fruited for the first time :

Koolstock.—Tree a medium grower. Fruit above medium size, pyriform tapering sharply to the stem, which is one inch long; skin whitish green, with many small gray dots. Flesh white, juicy, smooth, fine-grained, gritty near the core, and a little astringent. Season last of August.

Loriol de Barney.—Tree a moderate grower. Fruit long pear shape, smooth and tapering to a point at the stem; skin greenish, nearly covered with orange and sprinkled with small gray dots. Flesh whitish, fine-grained, juicy, sweet, with a pleasant flavour. Season September.

King Sobieski.—Tree a slow grower. Fruit blunt pyriform, of medium size; skin orange with a reddish cheek and freely sprinkled with gray dots. Flesh whitish, fine-grained, juicy, sweet, with a pleasant flavour. Season, September.

Madam Verte.—Tree a slow grower. Fruit of medium size, almost globular; skin greenish orange, with a bright orange cheek. Flesh white, sweet, not very juicy, aromatic. Season September.

Diel's August.—Tree a strong grower. Fruit above medium size, obtuse pyriform; skin orange-yellow, with many brown dots and patches of russet. Flesh yellowish, coarse grained, slightly astringent. Not of fine quality. Season October.

Boisbunel.—Tree a strong grower. Fruit small, pyriform; skin greenish yellow, with a bronze red cheek and many brown dots. Flesh whitish, a little coarse, juicy, sweet, with a pleasant flavour. Season October.

Beurre Dumortier.—Tree a medium grower. Fruit of medium size, roundish, pyriform; skin yellowish-green, with patches of russet and many russet dots. Flesh greenish white, juicy, fine-grained, sweet. Season October.

Coloma.—Tree a strong grower. Fruit small, pyriform; skin greenish yellow, with large patches of russet and many russet dots. Flesh white, juicy, breaking, with a pleasant vinous flavour. Season October.

Crassane d'Automne.—Tree a medium grower. Fruit of medium size, ovate, pyriform; skin yellowish russet green, sprinkled with russet dots. Flesh coarse-grained, not juicy, but sweet and of a pleasant flavour. Season October.

Dr. Gromier.—Tree a strong grower. Fruit below medium size, roundish, pyriform ; skin green, with a bronze-red cheek and small patches of russet. Flesh white, juicy, breaking, sweet, with a pleasant flavour. Season October.

Luizette.—Tree a medium grower. Fruit above medium size, oblong, obtuse, pyriform ; skin greenish yellow, with a little red on the sunny side. Flesh whitish, fine grained, buttery, juicy, sweet. Season last of October.

King Charles.—Tree a vigorous grower. Fruit large, oblong, obtuse, pyriform; skin greenish, nearly covered with russet and sprinkled with yellow dots. Flesh white, fine grained, juicy, slightly astringent. Season last of October and November.

Calixte Mignot.—Tree a moderate grower. Fruit below medium size, long, smooth, pyriform; skin smooth, yellow, with a russet-reddish cheek and a few small brown dots. Flesh white, fine grained, juicy, with a pleasant flavour. Season November.

Sivenisher.—Tree a vigorous grower. Fruit of medium size or below medium, roundish, obovate ; skin green, shading to yellowish-green. Flesh white, juicy, tender, melting, with a sweet pleasant flavour. Season November.

PLUMS.

The plum trees never were more promising or more laden with bloom than last spring, even very small trees recently planted were full of flower, but beginning to blossom as they did in the latter part of March, and in the first part of April, when the weather was unfavourable for the proper fertilization of the flowers or for the development of the young plum, the result was disappointing. At the same time much wet weather prevented effective spraying, and was favourable for the development of fungus diseases, and in many cases the brown rot had attacked the fruit before it was half grown. A few of the trees were sprayed seven times from just before the breaking of the buds until the fruit was three-quarters grown, but the spraying was of little benefit, often being washed off soon after it had been applied, and thus did not prevent the rot. Some varieties appear to be particularly susceptible of rot and are a menace to other sorts that perhaps would otherwise escape. In the following list short descriptions are given of those sorts that fruited for the first time this season :—

Meroldt's Reine Claude.—Tree a strong grower. Fruit below medium size, globular, with a shallow suture ; skin pale yellow. Flesh yellowish, firm, not juicy or very sweet. Season middle of September.

Metz Mirabelle.—Tree a strong grower. Fruit small, globular; skin yellow. Flesh yellow, firm, juicy, sweet, stone very small. Season middle of August.

Brauman.—Tree a medium grower. Fruit small to medium, globular ; skin greenish yellow, with a whitish bloom. Flesh greenish, not juicy, sweet, with a pleasant flavour. Season last of August.

Chester.—Tree a strong grower. Fruit below medium size, oval ; skin dark red or nearly purple, with a thin bloom. Flesh greenish, moderately juicy, sweet. Season early September.

Montfort.—Tree a medium grower. Fruit of medium size, globular, with a deep suture ; skin reddish purple, with a white bloom. Flesh greenish, not juicy, sweet, with a pleasant flavour. Season last of August.

Catharine.—Tree a medium grower. Fruit medium to large, egg-shaped ; skin reddish, with a white bloom. Flesh yellow, sweet, juicy, with a pleasant flavour. Season last of August.

Late Muscatel.—Tree a strong grower. Fruit of medium size, roundish, one side enlarged ; skin reddish with a white bloom. Flesh greenish, sweet, rather dry, of good flavour. Season early September.

Throop.—Tree a strong grower. Fruit below medium size, oval, tapering to each end ; skin light red, with a whitish bloom. Flesh yellowish, and very juicy, sweet, with a pleasant flavour. Season early September.

Red Egg.—Tree a vigorous grower. Fruit small, oblong with neck, one side enlarged ; skin reddish. Flesh yellowish, sweet, rather dry, and granular. Season early September.

Dry's Seedling.—Tree a free grower. Fruit small to medium, oval ; skin reddish yellow, with a few brown dots. Flesh yellow, sweet and juicy, with a pleasant flavour. Season early September.

Partridge.—Tree a strong grower. Fruit of medium size, roundish, with a suture ; skin red, with a white bloom. Flesh yellowish, rather dry, sweet, with a pleasant flavour. Season early September.

Blue Egg.—Tree a medium grower. Fruit below medium size, oblong, egg-shaped, with a shallow suture ; skin light red, with a white bloom. Flesh yellowish, firm, moderately juicy, sweet, with a pleasant flavour. Season middle of September.

Swan's Yellow.—Tree a strong upright grower. Fruit of medium size, roundish, globe-shaped, suture deep, with a depression at each end. Flesh yellow, juicy, a little coarse, moderately sweet, with a pleasant flavour. Season middle of September.

Britzer Egg.—Tree a vigorous grower. Fruit below medium size, egg-shaped ; skin yellow. Flesh yellow, juicy, sweet, with a pleasant flavour, a little coarse in the grain. Season middle of September.

Niemburg Egg.—Tree a vigorous grower. Fruit of medium size, egg-shaped ; skin pale, dull red, with a whitish bloom. Flesh yellow, firm, moderately juicy, sweet, with a pleasant flavour. Season early and middle of September.

Steptoe.—Tree a strong grower. Fruit below medium size, egg-shaped ; skin purple, with a thin bloom. Flesh yellowish, juicy and sweet, with a pleasant flavour. Season September.

Mistake.—Tree a strong grower. Fruit above medium size, oblong oval, with a suture and one side enlarged ; skin purple, with a white bloom. Flesh yellowish, a little coarse, juicy, sweet, with a pleasant flavour. Season September.

Large English Damson.—Tree a strong and upright grower. Fruit a large Damson ; skin purple, with a thin bloom. Flesh greenish, juicy, with a pleasant flavour. Season last of September.

The varieties of trees with fruit free or nearly free from rot this year were Monarch, Mitchelson, Sultan, Annie Spath, Clyman, Cochet Pere and Blue Apricot. Of those described as fruiting for the first time, some were free from rot and some were not, but another season will give more evidence on which to base an opinion as to their power to resist this disease.

CHERRIES.

The cherry trees were very full of bloom this year, but during the blossoming period there were two frosts, and almost continuous cold rains, and most of the blossoms failed to fertilize, and as the rains continued through May and most of June, spraying was not effective, and the few cherries that did grow were many of them destroyed by the brown rot. A few of the young trees produced a few specimens, some of which, if they can be protected from the rot will be of value in this province.

The following brief descriptions are presented as to the character and date of ripening of the new sorts which have fruited here for the first time this season :—

Royal Morello.—Tree a medium grower. Fruit medium to small, round flattened; skin bright glossy red. Flesh juicy, pleasant, sprightly acid, firm. Season early July.

Winkler's White.—Tree a strong grower. Fruit medium to large, heart-shaped, skin yellowish red. Flesh firm, juicy, sweet. Season early July.

Kircheimer.—Tree a strong grower. Fruit of medium size, roundish oval ; skin dark glossy red. Flesh mild, pleasantly acid. Season early July.

Fromm's Heart.—Tree a strong grower. Fruit of medium size, heart-shaped ; skin dark glossy red. Flesh firm, juicy, sweet, and of pleasant flavour. Season early July.

Beauty of Marienhohe.—Tree a strong grower. Fruit small, roundish heart-shaped; skin light red with golden dots. Flesh yellowish, moderately juicy, sweet, Season early July.

**Seedling No.* 1.—Tree a vigorous grower. Fruit large, obtusely heart-shaped; skin glossy red. Flesh firm, juicy, sweet with a pleasant flavour. Season early July.

Seedling No. 2.—Tree a moderate grower. Fruit medium to large, heart-shaped ; skin bright red. Flesh firm, moderately juicy, sweet. Season early July.

Seedling No. 4.—Tree a strong grower. Fruit large, obtusely heart-shaped ; skin yellowish red. Flesh yellowish, juicy, tender, pleasantly acid. Season early July.

Seedling No. 9.—Tree a strong grower. Fruit small to medium in size, heart-shaped ; skin dark red. Flesh tender, juicy, moderately sweet, with a pleasant flavour. Season early July.

Guben.—Tree a medium grower. Fruit of medium size, round, flattened ; skin dark glossy red. Flesh red, tender, juicy, and pleasantly acid. Season early July.

Hedelfinger.—Tree a strong grower. Fruit large, heart-shaped ; skin dark red. Flesh firm, sweet, with a pleasant flavour. Season middle of July.

Schmehls.—Tree a vigorous grower. Fruit large, obtusely heart-shaped ; skin mottled, yellow and pale red. Flesh tender, juicy, and sweet, with a pleasant flavour. Season middle of July.

Seedling No. 19.—Tree a medium grower. Fruit of medium size, oval ; skin yellowish red. Flesh tender, juicy and sweet, with a pleasant flavour. Season middle of July.

Weichsel Ostheim.—Tree a medium grower. Fruit of medium size, roundish ; skin dark glossy red. Flesh juicy, tender, slightly acid, with a pleasant flavour. Season middle and last of July.

Lucien.—Tree a strong grower. Fruit heart-shaped ; skin pale yellowish red. Flesh juicy, tender, sweet and rich. Season middle of July.

Berlin Amarelle.—Tree a vigorous grower. Fruit medium to large, oval ; skin dark glossy red. Flesh tender, juicy and pleasantly acid. Season middle and last of July.

Germersdorf.—Tree a strong grower. Fruit large, obtusely heart-shaped ; skin glossy red. Flesh yellowish red, tender, juicy, sweet, with a pleasant flavour. Season last of July.

Princess.—Tree a moderate grower. Fruit very large, heart-shaped ; skin light red. Flesh pale yellowish red, tender, juicy, sweet, with a pleasant flavour. Season, middle and last of July.

Shadow Amarelle.—Tree a medium grower. Fruit of medium size, oval ; skin dark red. Flesh dark red, tender, juicy, mildly acid, with a pleasant flavour. Season, middle and last of July.

PEACHES, APRICOTS AND NECTARINES.

The peach, apricot and nectarine trees were very beautiful with bloom about the last of March. One peach and not one apricot or nectarine was the result from the

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* These seedlings under numbers have all been produced at the Experimental Farm.

orchards on the valley level. On the mountain, at about 600 feet elevation, a few Amsden and Foster trees had a light crop.

ALMONDS.

The Hard-shell Almonds bloomed but bore no fruit, and none of the soft-shell varieties have ever had any fruit, while the trees are large and thrifty and old enough to have borne several crops. As these seem to be useless in this climate, it is scarcely worth while continuing their cultivation.

QUINCES.

Constantinople.—Tree a free grower. Fruit medium size, pear-shape ; skin smooth clear orange.

MEDLARS.

All the medlars produced a crop, blooming as they do very late in May, they are pretty sure of mild weather, and always produce a crop.

GRAPES.

The grape vines made a vigorous growth, but were very late in starting and also very late in blooming, averaging 21 days later than previous years. The fruit in most instances failed to set and even the earliest sorts were not nearly ripe by October 1.

SMALL FRUITS.

There was a fairly good crop of small fruits this year. The blossoms were somewhat injured by the cold rains, and the frequent rain in June made the strawberries soft, and much of the crop was unfit for any but a local market. The rain also injured the currants, but the raspberries, black caps and black berries had fine weather for ripening and were of very good quality.

RED AND WHITE CURRANTS.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Knight's Early (red.)	July 7	Vigorous...	Small	Cluster short, fairly well filled, good flavour.	Moderately productive.
La Fertile.....	" 7	" ..	Large	Cluster long, well filled, very good quality.	Productive.
New Red Dutch	" 7	" ..	Large medium	Cluster medium in length, well filled, good quality.	"
La Turinese....	" 7	" ..	Medium	Cluster medium in length, well filled, good quality.	"
Fay's Prolific..	" 7	" ..	Large	Cluster long, well filled, good quality.	"
Large White Brandenburg	" 7	" ..	"	Cluster long, well filled, sweet, good flavour, very fine.	"
Frauendorfer (red.)	" 7	" ..	"	Cluster long, well filled, good flavour.	"
Verrier's White	" 7	" ..	Large medium	Cluster long, not well filled, good flavour.	Moderately productive.
Chenonceau (red.)	" 7	" ..	Large	Cluster long, well filled, sweet, fine flavour.	Productive.
Eyatt's New White.	" 7	" ..	Large medium	Cluster long, fairly well filled, good flavour.	"
Red Gondoin...	" 8	" ..	Small	Cluster short, not well filled, poor quality.	Not productive.
White Pearl....	" 8	" ..	Medium......	Cluster medium in length, not very well filled, good flavour.	Moderately productive.
Victoria	" 8	" ..	Large	Cluster medium in length, not well filled, fairly good flavour.	"
Red Cherry....	" 8	" ..	"	Cluster long, moderately well filled, quality fair.	"
No. 51	" 8	" ..	Small	Cluster short, fairly well filled, sweet, good flavour.	"
London Red...	" 8	" ..	Large medium	Cluster long, fairly well filled, small, good flavour.	Productive.
White Esperen.	" 9	" ..	Small	Cluster, short, fairly well filled, sweet. good flavour.	Moderately productive.
Large White...	" 9	" ..	Large medium	Cluster medium in length, well filled, good flavour.	Productive.
Rankin's Red..	" 10	" ..	Small	Cluster short, acid, not very good.	Not productive.
La Hative.....	" 10	" ..	Medium......	Cluster medium, sweet, good.	Productive.
Moore's Ruby..	" 10	" ..	Small	Cluster medium in length, not well filled, acid, fair flavour.	Moderately productive.
Prince Albert..	" 10	" ..	Large medium	Cluster long, moderately well filled, good flavour.	"
White Grape...	" 10	" ..	" ..	Cluster medium in length, well filled, good quality.	"
Versailles (red.)	" 10	" ..	Medium......	Cluster medium in length, well filled, good quality.	"
North Star.....	" 10	" ..	"	Cluster medium in length, fairly well filled, good flavour.	Productive.
Red Dutch.....	" 10	" ..	"	Cluster medium in length, well filled, acid, but good flavour.	"
La Conde	" 10	" ..	"	Cluster medium in length, not well filled, good flavour.	Moderately productive.
White Imperial.	" 10	Moderately vigorous.	Large medium	Cluster medium in length, fairly well filled, sweet, good flavour.	"
Large White Dessert.	" 12	Vigorous...	Large	Cluster long, well filled, acid, good flavour.	"
Large Red.....	" 12	" ..	Medium......	Cluster long, well filled, good flavour.	"

RED AND WHITE CURRANTS—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
English Red...	" 12	" ..	Large medium	Cluster long, well filled, good quality.	Productive.
Raby Castle....	" 12	" ..	Large	Cluster long, well filled, acid, good flavour.	"
Champaigner (white.)	" 12	" ..	Small	Cluster medium in length, fairly well filled, good flavour.	Moderately productive.
Ringen's (red)..	" 13	" ..	"	Cluster medium in length, fairly well filled, good flavour.	Productive.
White Cherry..	" 15	" ..	Large medium	Cluster long, well filled, sweet, good flavour.	"
Beauty of St. Giles.	" 15	Moderately vigorous.	Large	Cluster long, well filled, good flavour.	"
De la Rochepoze	" 15	" ..	Small	Cluster short, not very well filled, acid, fair flavour.	Moderately productive.
White Dutch...	" 15	Vigorous ...	Medium......	Cluster medium in length, well filled, acid, good flavour.	"
White Transparent.	" 15	" ..	"	Cluster medium in length, fairly well filled, good flavour.	"

BLACK CURRANTS.

Ruler.......	July 8	Vigorous....	Medium	Cluster medium in length, mild, sweet, good flavour.	Moderately productive.
Stirling........	" 8	" ..	"	Cluster medium in length, flavour a little rank.	" "
Bang Up.......	" 8	" ..	Large	Cluster long, mild, sweet flavour.	" "
Dominion .. .	" 10	" ..	Medium....	Cluster short, mild, good flavour.	" "
Lennox	" 10	" ..	"	Cluster medium in length, fairly good flavour.	" "
Ambrafarbidge.	" 10	" ..	Large	Cluster medium in length, mild, good flavour.	" "
Victoria	" 10	" ..	"	Cluster medium in length, sweet, good flavour.	Productive.
Gewohnliche...	" 10	" ..	"	Cluster short, mild, good flavour.	Moderately productive.
Beauty	" 10	" ..	Medium..	Cluster short, sweet, fairly good flavour.	Not productive.
Star...........	" 10	" ..	"	Cluster medium in length, sweet, pleasant flavour.	Moderately productive.
London........	" 11	" ..	"	Cluster medium in length, good quality.	" "
Success	" 11	" ..	"	Cluster long, sweet, mild flavour.	" "
Parker	" 11	" ..	Small	Cluster medium in length, flavour rank.	" "
Pearce.........	" 12	Moderately vigorous.	Medium......	Cluster medium in length, mild, pleasant flavour.	" "
Middlesex	" 12	Moderately vigorous.	Medium......	Cluster medium in length, quality fair.	" "
Kentish Hero..	" 12	Vigorous ..	" ...	Cluster medium in length acid good flavour.	Productive.
Stewart.... ...	" 12	" ..	" . . .	Cluster medium in length, flavour a little rank.	"
Wood..........	" 12	" .	" ...	Cluster medium in length, fair quality.	Moderately productive.
Lanark	" 12	" ..	"	Cluster short, flavour rank..	" "
Eagle	" 12	" ..	Large medium	Cluster long, thick skin, flavour rank.	" "

BLACK CURRANTS—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Black Naples...	July 12	Vigorous....	Large medium	Cluster long, sweet, mild flavour.	Moderately productive.
Ethel........	" 12	Moderately vigorous.	Medium...	Cluster medium in length acid fair flavour.	" "
Oxford........	" 14	Vigorous....	"	Cluster medium in length, quality fair.	Not productive.
Norton........	" 14	" ..	" ...	Cluster medium in length, mild, sweet, good flavour.	Productive.
Bella..........	" 14	" ..	Small	Cluster short, flavour rank..	Not productive.
Monarch......	" 14	" ..	Medium ...	Cluster long, flavour good ...	Productive.
Lee's Prolific...	" 15	" ..	"	Cluster medium in length, flavour fairly good.	"
Kentville	" 16	" ..	"	Cluster short, acid, flavour rank.	Moderately productive.
Henry........	" 17	" ..	" ..	Cluster long, sweet, good flavour.	Productive.
Ogden's Black..	" 17	" ..	" ...	Cluster short, flavour rank.	"
Ontario........	" 17	" ..	Large........	Cluster long, acid, flavour rank.	Moderately productive.
Climax.......	" 17	" ..	"	Cluster long, acid, quality fair.	Productive.
Pomona.......	" 18	" ..	Very large....	Cluster long, sweet, good flavour, the best we have.	"
Prince of Wales	" 18	" ..	Large	Cluster long, sweet, good flavour, next in quality to Pomona.	"
Lewis..........	" 18	" ..	Small	Cluster medium in length, sweet, good flavour.	Moderately productive.
Baldwin..	" 20	Not vigorous	"	Cluster short, not very good qualty.	" "
Manitoba Wild.	" 20	Vigorous....	"	Cluster short, flavour rank..	Not productive.

RED AND YELLOW RASPBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Hansell	June 27	Vigorous ...	Small........	Crumbly, light red, round, good flavour.	Productive.
Thompson.....	July 1	" ...	"	Moderately firm, round, bright red, good flavour.	"
Crimson Beauty	" 1	Moderately vigorous.	Medium......	Firm, round, bright red, good flavour.	"
Marlboro.....	" 1	Vigorous ...	Small	Firm, round, bright red, good flavour.	"
Champion.....:	" 1	" ...	"	Soft, sweet, quality only fair.	Moderately productive.
Phoenix.......	" 1	" ...	Large........	Firm, round, bright red, good flavour.	Productive.
Battler's Giant.	" 1	" ...	Medium......	Moderately firm, dark red, fair flavour.	"
Arnold's Hybrid	" 1	" ...	"	Crumbly, round, light red, fair flavour.	Moderately productive.
Paragon........	" 1	" ...	Large medium	Firm, bright red, sweet, fair quality.	Productive.
Northumberl'nd Fill Basket.	" 3	" ...	Very large...	Firm, conical, dark red, very good quality.	"
Belle de Fontenay.	" 4	" ...	Large medium	Firm, dark red, round, good quality.	"
Carter's Prolific	" 4	Moderately prolific.	Small	Firm, sweet, fair flavour.....	"
Sugar of Metz..	" 4	Vigorous....	Large medium	Soft, yellow, round, sweet, not of very much value.	"
New Fastollf...	" 6	" ...	Large........	Firm, conical, dark red, sweet, good quality; continues long in bearing.	"

RED AND YELLOW RASPBERRIES—*Continued.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Large Yellow..	July 6	Vigorous ...	Large	Firm, obtuse, conical, dull yellow, sweet.	Productive.
Lord Beaconsfield.	" 6	" ..	"	Firm, round, a bright red, sweet, good flavour.	"
Herrenhauser Red Perpetual	" 6	" ...	Medium	Firm, round, dark red, sweet, fair flavour.	Moderately productive.
R. B. Whyte.	" 6	" ...	Large	Moderately firm, round, dark red, sweet, good flavour.	Productive.
Garnet.........	" 6	" ..	Small	Firm, purplish-red, round, not very good quality.	Not productive.
Malta	" 6	Moderately vigorous.	Medium	Soft, yellow, round, good flavour.	"
French Vice-President.	" 8	Vigorous....	Very large	Firm, conical, dark red, sweet, good flavour, but adheres too tightly to the core.	Productive.
Knevit's Giant.	" 8	" ...	Large	Crumbly, round, bright red, sweet, good flavour.	"
Autumn Surprise.	" 10	" ...	Large medium	Soft, yellow, round, not very good.	"
Baumforth Seedling.	" 10	Moderately vigorous.	Small medium	Moderately firm, round, dark red, sweet, flat flavour.	"
Wilder	" 10	Vigorous....	Medium.....	Moderately firm, sweet, fairly good flavour.	Not productive.
Brinckle's Orange.	" 10	" ...	Large	Soft, sweet, good flavour	Productive.
Golden Queen.	" 10	" ...	"	Firm, sweet, good; best yellow raspberry we have.	"
All Summer....	" 10	" ...	"	Firm, conical, bright red, good flavour.	"
Muskingum....	" 10	" ...	Small medium	Crumbly, dark red, sweet....	"
Cariboo Wild ..	" 10	" ...	Small	Soft, crumbly, tart, good flavour.	Not productive.
Turner	" 10	" ...	"	Crumbly, round, bright red, sweet.	"
Sarah	" 10	" ...	Large medium	Firm, round, bright red, very good quality.	"
Guinea	" 10	Feeble.....	Small.........	Round, purplish red, not good.	Not productive.
Mary	" 10	Vigorous ..	"	Round, red, poor flavour.....	"
Lady Anne ...	" 10	" ...	"	Yellow, soft, flat flavour.....	"
Sharpe	" 10	Feeble.... .	"	Red, sweet, not very good...	"
Craig	" 10	Vigorous ...	Medium	Rather soft, clear red, good flavour	Productive.
Percy	" 13	Moderately vigorous.	Large medium	Firm, purplish red, sweet, good flavour.	Moderately productive.
Muriel	" 13	Vigorous ...	" ..	Firm, dark red, round, good flavour.	" "
Bee Hive	" 13	" ...	" ..	Crumbly, dark red, sweet, good flavour.	" "
Queen of the Market.	" 13	" ...	Large	Firm, dark red, sweet, good quality; like Cuthbert.	Productive.
Red Herrenhauser.	" 13	" .	Medium	Firm, large, dark red, round, fair flavour.	"
Shaffer's Colossal.	" 13	" ...	Large	Firm, purplish red, acid.....	"
Garfield..	" 13	" ...	Medium	Moderately firm, red, round, good flavour.	"
La Mercier.....	" 14	Moderately vigorous.	Large	Crumbly, large, round, dark red, sweet, good flavour.	"
Chili	" 14	Vigorous ...	Large medium	Moderately firm, large, dark red, sweet, good flavour.	"
Duke of Brabant	" 14	" ...	Large	Firm, roundish conical, bright red, sweet, very good quality	"

RED AND YELLOW RASPBERRIES—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Col. Wilder....	July 14	Feeble......	Medium	Soft, pale yellow, sweet, not of much value.	Moderately productive.
Empire........	" 15	" ...	Small	Firm, round, acid, not very good.	Not productive.
Hebner	" 15	Vigorous ...	Medium.. ...	Soft, red, sweet, good flavour, not of much value.	"
Cuthbert	" 15	" ..	Large	Firm, conical, dark red, very good quality.	Very productive.
Hornet	" 15	Feeble......	Small medium.	Moderately firm, large, fair flavour.	Moderately productive.
Clarke..	" 15	Vigorous ...	Medium	Moderately firm, conical, red, sweet, fair flavour.	Productive.
Carleton	" 15	" ...	"	Firm, round, red, sweet, good flavour.	"
Fastolff..	" 17	" ...	"	Firm, red, sweet...........	"
Pauline........	" 17	" ...	Large	Rather soft, round, dark red, crumbly, sweet, good flavour.	"
Miller	" 17	" ...	Medium	Large, round, red, sweet, good flavour.	"
Nonpareil.....	" 17	" ...	Small..........	Moderately firm, bright red, sweet, good flavour.	"
Barnet	" 17	Moderately vigorous.	Medium	Soft, round, red, sweet, not good quality.	Not productive.
Oregon Late ...	" 17	" ..	"	Firm, sweet, fair flavour.....	"
Lizzie...... ...	" 24	Feeble......	"	Round, red, sweet...........	Moderately productive.
Franconia......	" 24	Moderately vigorous.	Small........	Not of any value......	" "
Queen Victoria.	" 24	Vigorous ...	Medium	Crumbly, red, quality fair...	" "
Sir John.	" 24	" ...	Small medium	Crumbly, red, acid, not of much value.	Productive.
Goliath	" 24	" ...	Large medium	Moderately firm, round, dark red, sweet, good flavour.	"
Prince of Wales	" 24	Moderately vigorous.	Medium	Firm, round, dark red, sweet, good flavour.	Moderately productive.

BLACK CAP RASPBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Fruit.	Quality.	Productiveness.
Smith's Prolific.	July 7	Vigorous....	Medium	Fairly good quality..........	Productive.
Early Ohio.....	" 10	"	Large medium	Not very good quality.	"
Nemaha. ...	" 10	" ...	Large	Fine flavour, good quality....	"
Older.	" 15	"	Large medium	Good quality................	"
Conrath	" 16	"	Large	A fine flavoured, handsome berry; a little acid.	"
Lovett ...,.....	" 16	Moderately vigorous.	Medium......	Good quality	"
Cromwell	" 16	Vigorous....	"	Fairly good quality.....	"
American Yellow Cap.	" 18	"	Small	Sweet, good quality	"
Kansas	" 20	"	Medium.... .	" "	"
Palmer	" 20	"	"	Fairly good quality..	"
Ada	" 20	"	"	" "	"
Gregg	" 21	"	Large	Very good quality.	"
Progress	" 23	" ...	"	Sweet, good quality	"
Jackson's May King.	" 23	"	Small medium	Poor quality.........	Moderately productive.
Hopkins......	" 23	"	Medium	Good quality......	Productive.

BLACKBERRIES.

Name.	Date of Ripening.	Growth of Plant.	Size of Berry.	Quality.	Productiveness.
Early King	Aug. 6	Vigorous....	Large medium	Good quality	Productive.
Minnewaska....	" 6	"	"	Firm, good quality..........	"
Early Harvest..	" 7	"	Medium....	Quality only fair	Not productive.
Early Cluster ..	" 7	"	"	Sweet, firm, good quality....	Productive.
Agawam.	" 7	"	Large medium	Fine appearance and good quality.	"
Snyder	" 7	" ..	"	Very good quality...........	"
Hansel....	" 8	Moderately vigorous.	Small	Not very good quality.......	Moderately productive.
Brunton	" 8	Feeble......	"	Not good quality......	Not productive.
Ohmer	" 8	Moderately vigorous.	Large	Fairly good quality...... ...	Productive.
Stone's Hardy..	" 10	Vigorous....	Large medium	Firm, sweet, good quality....	"
Erie	" 10	"	Large	A little acid, but good quality	Moderately productive.
Taylor's Prolific	" 10	"	"	Sweet, good quality.	Productive.
Eldorado .	" 10	"	Very large....	Sweet, very fine flavour, good quality.	"
Wilson's Early.	" 12	"	Large medium	Firm, good quality..........	"
Tecumseh	" 14	Moderately vigorous.	Small	Not very good quality.....	Not productive.
Kittatinny.....	" 14	Vigorous....	Large medium	Acid; fairly good quality....	Moderately productive.
Wilson Junior..	" 16	"	Medium.....	Good quality................	Productive.
Maxwell... ...	" 16	Moderately vigorous.	"	Not very good quality.	Moderately productive.
Lawton........	" 16	Vigorous....	Large medium	Quality fair.................	" "
Oregon Everbearing.	Aug. 10 to Oct. 15	Very vigorous.	Large	Quality good when very ripe, a little acid.	Very productive.

STRAWBERRIES.

Arrow.	June 7	Vigorous ...	Medium.... ..	Firm; bright red; sweet, good flavour.	Productive.
Eleanor........	" 7	" ...	Large medium	Firm; dark red; round; good flavour, sweet.	"
Dayton	" 7	" ...	Large	Firm; deep red; conical; sweet, good flavour.	"
Chairs	" 7	" ...	Large medium	Firm; bright red; conical; sweet, fine flavour.	"
Anna Kenedy..	" 8	" ...	Medium.....	Firm; sweet, good quality...	"
Van Deman ...	" 9	" ...	"	Firm; dark red; conical; good quality.	"
Alpha........	" 10	" ...	Large medium	Firm; red; round; fairly good quality.	Not productive.
Iowa Beauty...	" 10	" ...	Large	Firm; bright red; very good quality.	Productive.
Alexander II...	" 10	" ...	Medium. ...	Firm; bright red; sweet, good flavour.	Moderately productive.
Omega	" 10	" ...	"	" " ..	Productive.
Bissel	" 10	" ...	Large	Rather soft; light red; irregular in shape; stem long and strong.	Moderately productive.
Timbrell... .	" 11	" ...	"	Firm; sweet, good quality; stem long and strong.	Productive.
Bonnie Lass....	" 12	Moderately vigorous.	Medium	Firm; sweet, good quality...	Moderately productive.
Brandywine....	" 12	Vigorous ...	Large medium	Firm; conical; dark red; good quality; stem short.	" "

STRAWBERRIES—*Concluded.*

Name.	Date of Ripening.	Growth of Plant.	Size of Berry.	Quality.	Productiveness.
Warfield	June 17	Vigorous	Medium	Firm; dark red; round; sweet, good flavour.	Productive.
Windsor Chief	" 13	"	Large medium	Firm; deep red; conical; acid; good flavour.	"
Greenville	" 13	"	Large	Firm; bright red; round; even in size; very good quality.	"
Maxwell	" 13	"	Large medium	Firm; light red; round; sweet, good quality.	"
Tennessee Prolific.	" 13	"	"	Firm; bright red; conical; a little acid; good quality.	"
Devereau	" 14	"	Medium	Moderately firm; light red; conical; good quality.	Moderately productive.
Mary	" 15	"	Large medium	Firm; pale red; sweet, good quality.	" "
Weston	" 15	Moderately vigorous.	Medium	Fairly firm; conical; dark red; a little acid; fair flavour.	" "
Laxford Hall	" 15	Vigorous	Large	Firm; light red; conical; even in size; good quality.	Productive.
Dr. Hogg	" 15	"	Medium	Firm; sweet, good flavour	Moderately productive.
Crockett's Choice.	" 15	"	Small	Firm; dark red; conical; sweet, good flavour.	Not productive.
Improved Westbrook.	" 16	"	Large	Moderately firm; light red; fairly good quality.	Productive.
Michigan	" 17	"	Very large	Firm; ripens unevenly and is uneven in shape; fairly good flavour.	Moderately productive.
H. W. Beecher	" 17	"	Large	Firm; light red; sweet, good flavour.	Productive.
Improved Jucunda.	" 17	"	"	Firm; bright red; round; sweet, very good quality.	"
Magoon	" 17	"	Very large	Firm; bright red; sweet, good quality but a little uneven in shape.	"
British Queen	" 12	"	Large	Firm, dark red, roundish conical, sweet, good flavour.	Moderately productive.
Imperial Newman.	" 17.	"	Medium	Firm, bright red, conical, good quality.	"
Sir Joseph Paxton.	" 18.	"	"	Firm, fair quality	"
Empress Eugenie.	" 18.	Moderately vigorous.	Small	Firm, sweet, good flavour	"
Enchantress	" 18.	"	Large	" "	"
Eclipse	" 18.	"	Small medium	Firm, light red conical, sweet, good flavour.	Not productive.
Arkansas Traveler.	" 19.	Vigorous	Large	Firm, dark red conical, sweet, good flavour.	Productive.
Kansas Prolific.	" 19.	"	Very large	Firm bright red, good quality, stem long and strong.	"
Laxton's Noble.	" 19.	Moderately vigorous.	Small	Poor quality	Not productive.
White Alpine	" 27.	Vigorous	Large	Firm, pinkish white, oblong, sweet, good flavour, stem long and strong.	Productive.

METEOROLOGICAL RECORD.

Date of Highest Temperature.	Degrees	Date of Lowest Temperature.	Degrees.	Rainfall.	Snowfall.	Sunshine.	
				Inches.	Inches.	Hours.	Minutes.
1900.		1900.					
December 18	56	December 30....	27	7·5	8	47	18
1901.		1901.					
January 20	59	January 9......	11	5·7	19	44	12
February 25........	54	February 5.....	16	3·79	7	83	12
March 20.........	66	March 11......	30	3·16	....	67	6
April 30..............	71	April 18.........	28	2·79	4	127	54
May 26...............	90	May 13.........	38	4·80	....	167	54
June 14...............	83	June 28.........	41	7 8	....	80	0
July 28..............	83	July 26.......	42	1·25	....	205	0
August 21............	91	August 1......	45	....	....	224	6
September 18.........	79	September 28....	35	1·59	....	99	48
October 23........	76	October 14......	36	4·15	....	92	6
November 3..........	66	November 18....	31	10 57	....	18	30
		Totals.....		51·30	30	1,157	6

The record for the year ending November 30 shows a low rate of sunshine for the year, and a light rainfall.

I have the honour to be, sir,
Your obedient servant,

THOS. A. SHARPE.

STATEMENT OF EXPENDITURE ON THE DOMINION EXPERIMENTAL FARMS FOR THE YEAR ENDING JUNE 30, 1901.

CENTRAL EXPERIMENTAL FARM—EXPENDITURE, 1900-1901.

Live stock	$ 935 65
Feed for stock, including veterinary services	998 53
Seed grain, seeds, trees, &c	437 70
Implements, tools, hardware and supplies	939 87
Drainage and drain tiles	1,501 91
Manure and fertilizers for experimental plots and Hort. dept.	263 73
Travelling expenses	1,491 73
Exhibition expenses	261 69
Blacksmithing, harness supplies and repairs	849 55
Bee department	160 00
Salaries	1,916 25
Wages, farm work, including experimental work with grain and other farm crops; also, salaries of officers in charge	6,607 45
Wages, care of stock	2,345 25
Chemical department proportion chargeable to the Central Farm	1,184 26
Botanical and Entomological department proportion chargeable to the Central Farm	1,299 92
Horticultural department, including salary of officer in charge	4,829 89
Poultry department, including salary of officer in charge	1,660 06
Forestry department and care of grounds	1,068 98
Arboretum	684 16
Distribution of trees and tree seed	78 24
Office help, correspondence branch and messenger service	4,378 13
Printing and stationery	588 29
Seed testing and care of greenhouses	944 62
Dairy department	649 44
Contingencies	308 54
Books and newspapers	122 03
Telegrams and telephones	161 69
Steers purchased for feeding experiments	3,445 40
Hogs purchased for feeding experiments	256 28
	$ 40,369 24
LESS—Proceeds of sale of steers purchased for feeding experiments	5,266 55
	$ 35,102 69

EXPERIMENTAL FARM, NAPPAN, N.S.—EXPENDITURE, 1900-1901.

Live stock	$ 83 40
Feed for stock, including veterinary services	2,178 72
Seed grain, seeds, trees, &c	51 69
Implements, tools, hardware and supplies	382 31
Manure and fertilizers	29 98
Travelling expenses	399 01
Exhibition expenses	169 74
Blacksmithing, harness supplies and repairs	206 77
Salary of Superintendent, also proportion of salaries for general work, Ottawa	2,517 82
Wages, farm work, including experimental work with farm crops	2,310 91
Wages, care of stock	1,503 06
Chemical department, proportion chargeable to each branch farm	690 82
Botanical and Entomological department, proportion chargeable to each branch farm	525 00
Poultry department	129 91
Horticultural department, including salary of officer in charge	1,046 51
Forestry department, including care of grounds	112 00
Seed grain distribution	192 41
Contingencies, including postage, $28.10; mail delivery, $82.50	148 05
Printing and stationery	8 34
Books and newspapers	21 50
Telegrams and telephone	39 24
Steers purchased for feeding experiments	1,434 00
Drainage and drain tiles	98 25
	$ 14,279 44
LESS—Proceeds of sale of steers purchased for feeding experiments	2,203 03
	$ 12,076 41

EXPERIMENTAL FARM, BRANDON, MANITOBA—EXPENDITURE, 1900–1901.

Live stock	$	30 89
Feed for stock, including veterinary services		71 65
Seed grain, seeds, trees, &c		111 04
Implements, tools, hardware and supplies		248 30
Travelling expenses		30 55
Exhibition expenses		193 00
Blacksmithing, harness supplies and repairs		255 18
Bee department		2 00
Salary of superintendent, also proportion of salaries for general work, Ottawa		2,617 81
Wages, farm work, including experimental work, with farm crops, &c		2,560 30
Wages, care of stock		872 25
Chemical department, proportion chargeable to each branch farm		690 82
Botanical and entomological department, proportion chargeable to each branch farm		525 00
Horticultural department		252 82
Forestry department, including care of grounds		474 50
Poultry department		50 90
Office help, including delivery of mail, $121.00		798 00
Seed grain distribution		528 24
Tree distribution		270 76
Contingencies, including postage, $55.00		99 31
Printing and stationery		45 67
Books and newspapers		20 40
Telegrams and telephones		54 30
Steers purchased for feeding experiments		562 25
	$	11,365 94
Less—Proceeds of sale of steers purchased for feeding experiments		872 19
	$	10,493 75

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.—EXPENDITURE, 1900–1901.

Live stock	$	20 00
Feed for stock, including veterinary services		49 25
Seed grain, seeds, trees, &c		64 10
Implements, tools, hardware and supplies		271 61
Travelling expenses		32 85
Exhibition expenses		46 75
Blacksmithing, harness supplies and repairs		139 75
Salary of superintendent, also proportion of salaries for general work, Ottawa		2,617 81
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		2,816 22
Wages, care of stock		808 50
Chemical department, proportion chargeable to each branch farm		690 82
Botanical and entomological department, proportion chargeable to each branch farm		525 00
Horticultural department		386 30
Poultry department		67 10
Forestry department, including care of grounds		211 67
Office help		612 33
Seed grain distribution		448 34
Tree distribution		204 27
Contingencies, including postage, $105.82		130 17
Printing and stationery		45 60
Telegrams		34 23
Books and newspapers		14 00
Steers purchased for feeding experiments		597 90
	$	10,834 57
Less—Proceeds of sale of steers		1,204 40
	$	9,630 17

EXPERIMENTAL FARM, AGASSIZ, B.C.—EXPENDITURE, 1900–1901.

Live stock		123 37
Feed for stock, including veterinary services		60 59
Seed grain, seeds, trees, etc.		231 76
Implements, tools, hardware and supplies		190 97
Manure and fertilizers		180 94
Travelling expenses		74 25
Exhibition expenses		130 75
Blacksmithing, harness supplies and repairs		124 70
Salary of superintendent, also proportion of salaries for general work, Ottawa		2,517 81
Wages, farm work, including experimental work with farm crops, fruit trees, vines, &c		2,315 66
Wages care of stock		417 25
Chemical department, proportion chargeable to each branch farm		690 82
Botanical and entomological department, proportion chargeable to each branch farm		525 00
Poultry department		149 95
Forestry department		197 40
Office help		120 00
Seed grain distribution		173 48
Tree distribution		19 19
Clearing land		477 00
Contingencies, including postage, $65.23		102 97
Printing and stationery		3 65
Books and newspapers		19 00
Telegrams		2 65
Drainage and drain tiles		357 86
Bee department		1 00
Steers purchased for feeding experiments		75 00
	$	9,283 02
LESS—Proceeds of sale of steers		484 00
	$	8,799 02

SUMMARY.

Central Experimental Farm		$	35,102 69
Nappan "			12,076 41
Brandon "			10,493 75
Indian Head "			9,630 17
Agassiz "			8,799 02
Seed grain distribution from Central Experimental Farm			3,897 96
Printing bulletins and distribution of bulletins and reports.	$ 5,500 00		
Less special sum in estimates for this item	5,500 00		
		$	80,000 00

SUMMARY OF STOCK, MACHINERY, IMPLEMENTS, &c., ON HAND DECEMBER 31, 1901.

CENTRAL EXPERIMENTAL FARM, OTTAWA.

19 Horses	$	2,335 00
9 Ayrshire cattle		1,775 00
9 Guernsey cattle		1,540 00
9 Durham cattle (Shorthorns)		2,140 00
30 Grade cattle		600 00
8 Yorkshire swine		245 00
11 Berkshire swine		243 00
3 Tamworth swine		110 00
18 Grade swine		180 00
4 Large black swine		100 00
18 Shropshire sheep		810 00
11 Leicester sheep		275 00
7 Grade sheep		35 00
Farm machinery and implements		2,780 50
Vehicles, including farm wagons and sleighs		1,158 70
Hand tools, hardware and sundries		1,201 45
Harness		446 80
Dairy department, machinery, &c		618 85
Horticultural and forestry departments, implements, tools, &c		582 55
Botanical department, implements, tools, &c		9 95
Poultry department, 314 fowls		295 00
Poultry department, implements, furnishings, &c		98 11
Bees and apiarian supplies		483 28
Chemical department, apparatus and chemicals		1,985 00
Books in several departments		495 85
Greenhouse plants, supplies, &c		1,836 75
Furniture at Director's house		1,065 78
Office furniture and stationery		1,269 35
		24,715 92

EXPERIMENTAL FARM, NAPPAN, N.S.

6 Horses	$	715 00
7 Guernsey cattle		1,110 00
6 Holstein cattle		270 00
9 Ayrshire cattle		710 00
2 Jersey cattle		200 00
44 Grade cattle		1,212 00
2 Yorkshire swine		45 00
3 Berkshire swine		70 00
1 Tamworth swine		20 00
63 Grade swine		330 00
34 Sheep		296 00
38 Fowls		19 50
Bees and apiarian supplies		27 50
Vehicles, including farm wagons and sleighs		325 00
Farm machinery		560 00
Farm implements		218 50
Hand tools, hardware and sundries		394 72
Harness		186 50
Furniture for reception room and bedroom for visiting officials		157 50
Furniture supplies and books for office		90 00
		6,957 22

EXPERIMENTAL FARM, BRANDON, MANITOBA.

12 Horses	$	1,035 00
4 Ayrshire cattle		210 00
8 Durham cattle		640 00
1 Guernsey bull		100 00
1 Holstein cattle		30 00
6 Grade cattle		125 00
2 Tamworth swine		30 00
6 Berkshire swine		60 00
2 Yorkshire swine		30 00
4 Grade swine		12 00
68 Fowls		68 00
Bees and apiarian supplies		123 95
Vehicles, including farm wagons and sleighs		467 00
Farm machinery		992 00
Farm implements		610 00
Hand tools, hardware and sundries		633 50
Harness		216 50
Furniture for reception room and bedroom for visiting officials		161 55
Furniture supplies and books for office		286 80
		5,831 30

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

13 Horses	$	1,310 00
1 Ayrshire bull		75 00
17 Durham cattle		1,545 00
1 Guernsey bull		75 00
18 Grade cattle		485 00
12 Berkshire swine		115 00
16 Tamworth swine		105 00
2 Yorkshire White swine		30 00
68 Fowls		47 00
Bees and apiarian supplies		33 75
Vehicles, including farm wagons and sleighs		498 50
Farm machinery		1,036 00
Farm implements		649 00
Hand tools, hardware and sundries		518 05
Harness		156 50
Furniture for reception room and bedroom for visiting officials		167 50
Furniture supplies and books for office		364 90
		7,211 20

EXPERIMENTAL FARM, AGASSIZ, B.C.

6 Horses	$	375 00
13 Durham cattle		900 00
6 Grade cattle		155 00
9 Dorset horned sheep		102 50
5 Berkshire swine		60 00
6 Tamworth swine		60 00
9 Grade swine		27 00
51 Fowls		51 00
Bees and apiarian supplies		33 05
Vehicles, including farm wagons		200 00
Farm machinery		533 55
Farm implements		117 00
Hand tools, hardware and sundries		202 60
Harness		72 25
Furniture for reception room and bedroom for visiting officials		136 40
Furniture supplies and books for office		159 50
		3,184 85

W. H. HAY, *Accountant.*

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